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SERVO杂志中文精华合集



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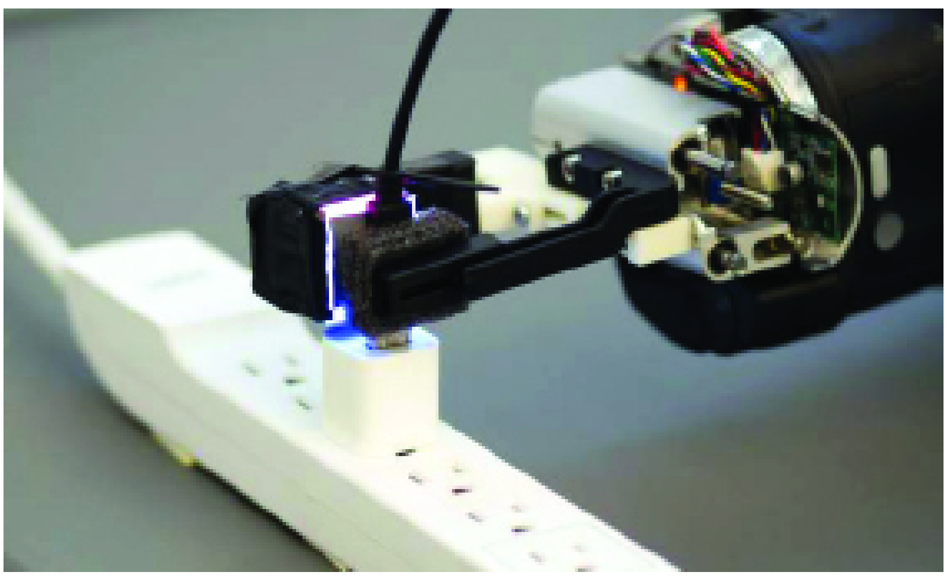
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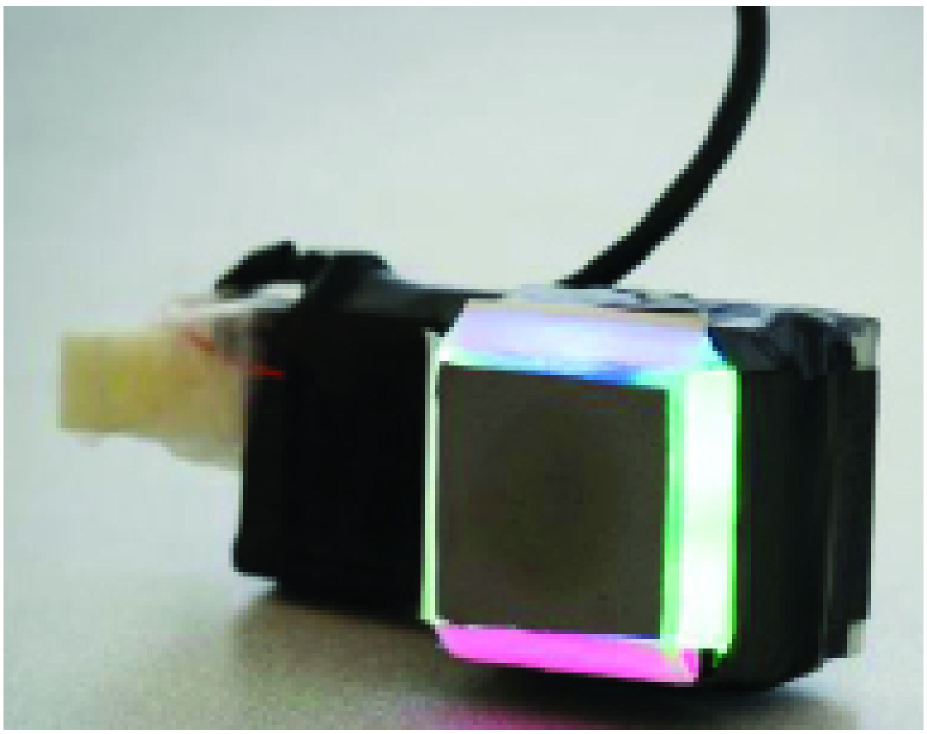
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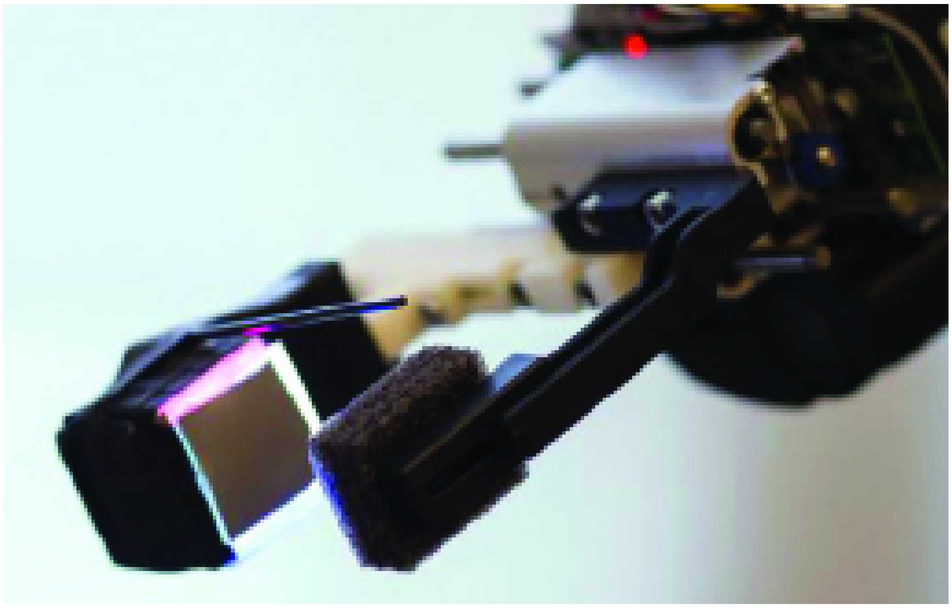
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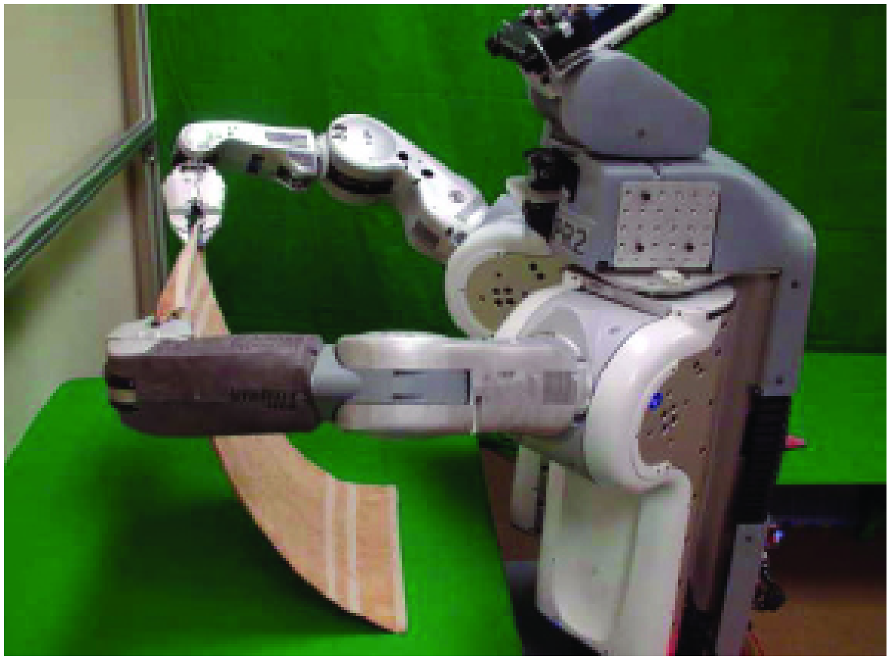
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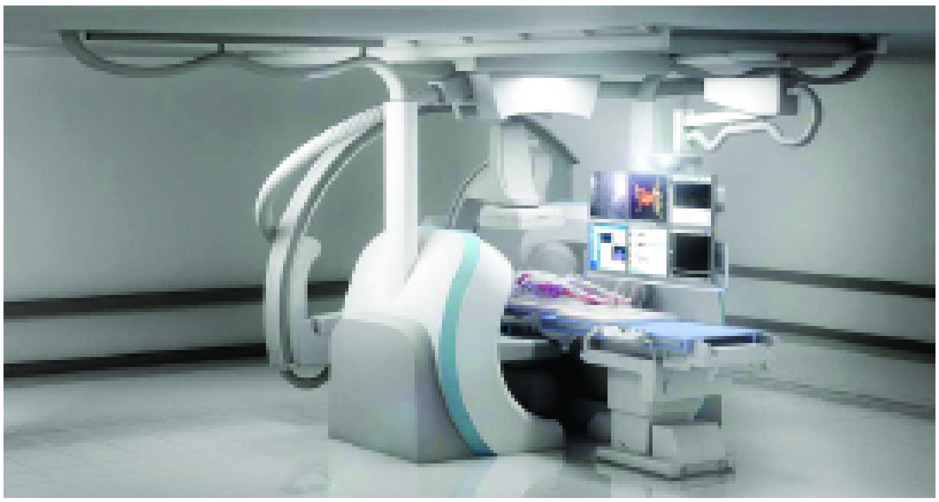
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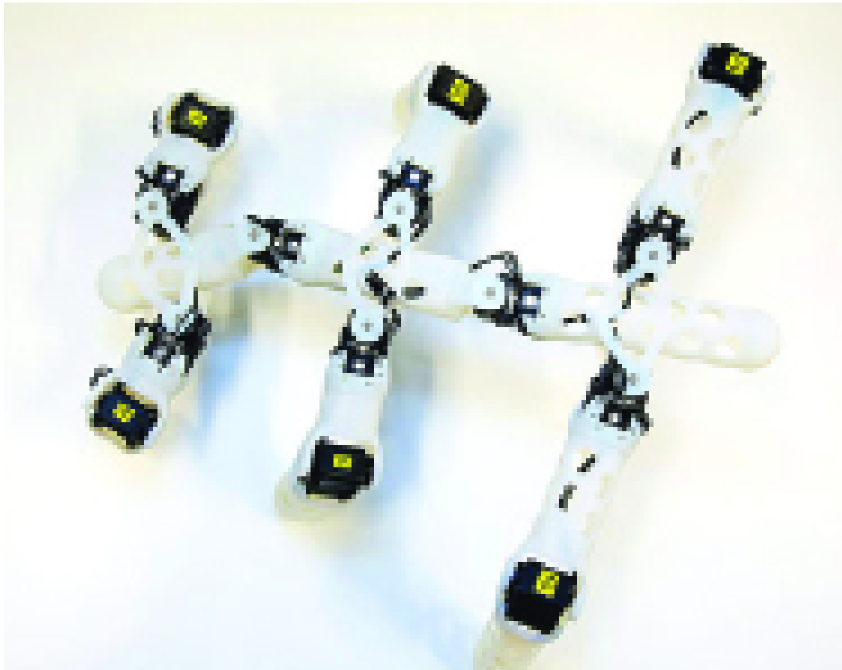
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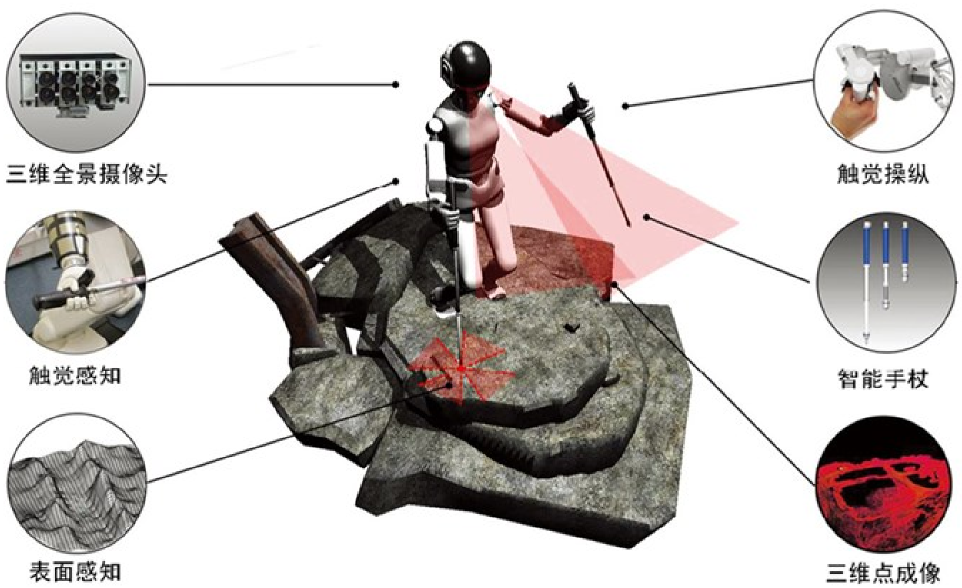
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Boston Dynamic BigDog

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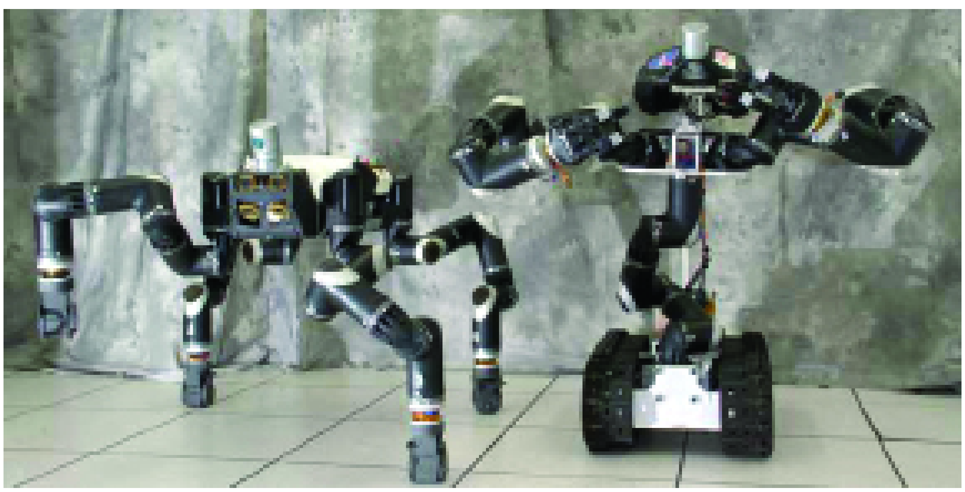
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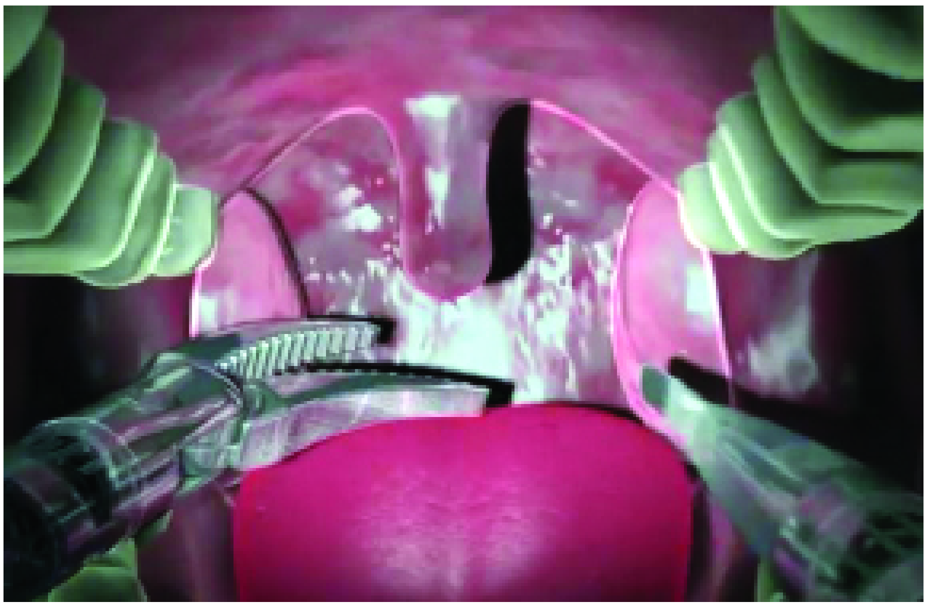
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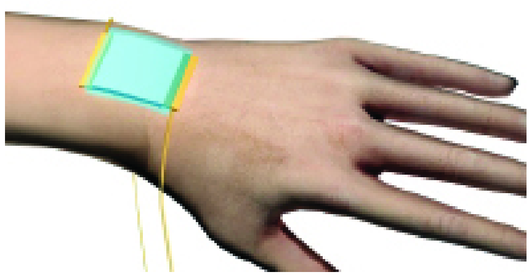
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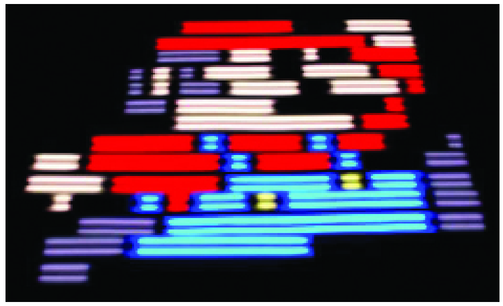
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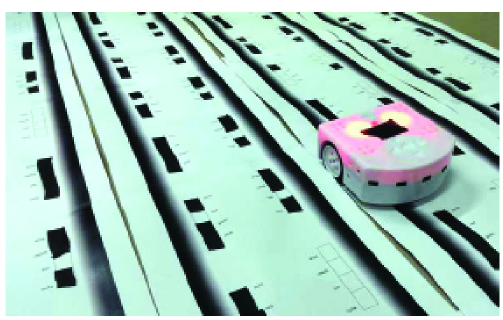


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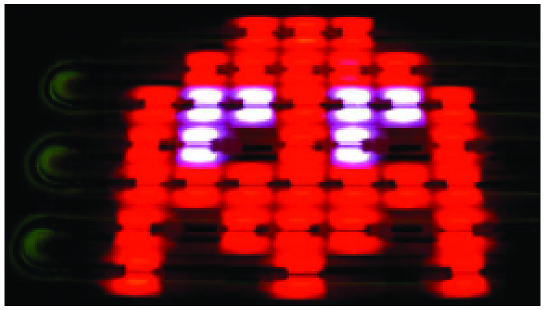
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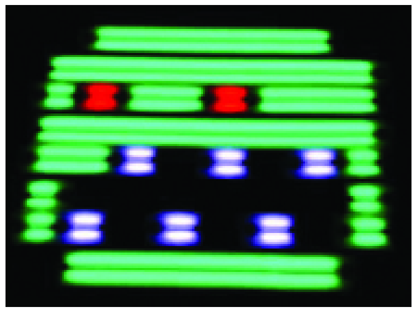
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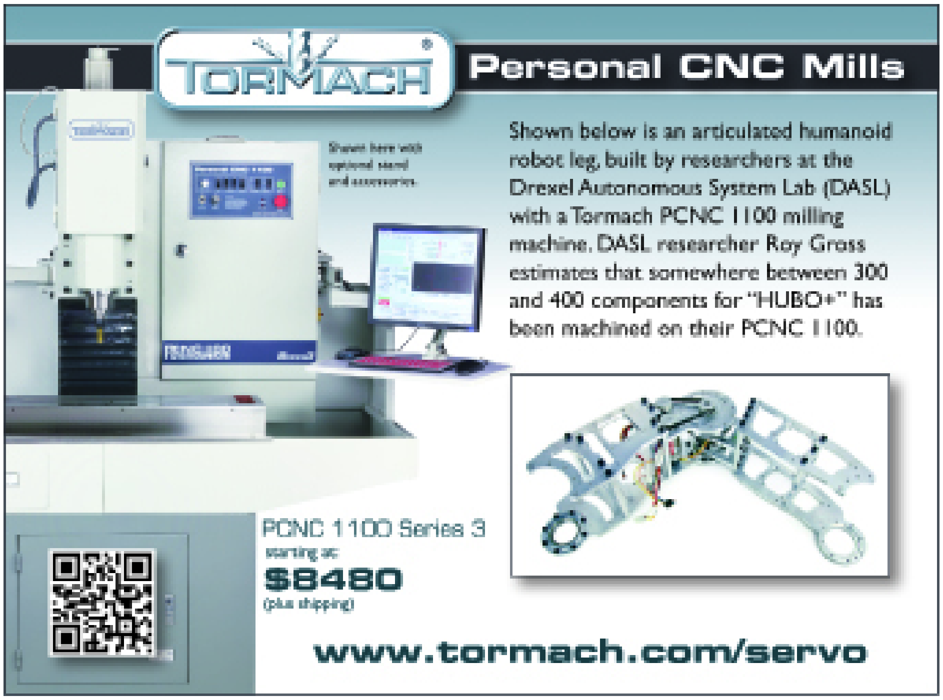
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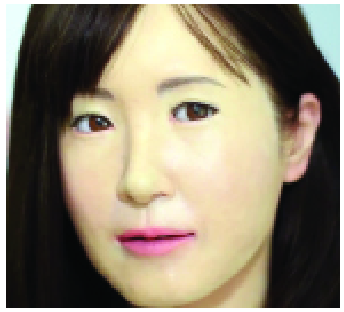


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Alex Forrest[illegible]2014[illegible]10[illegible]UBC-Gavia[illegible]
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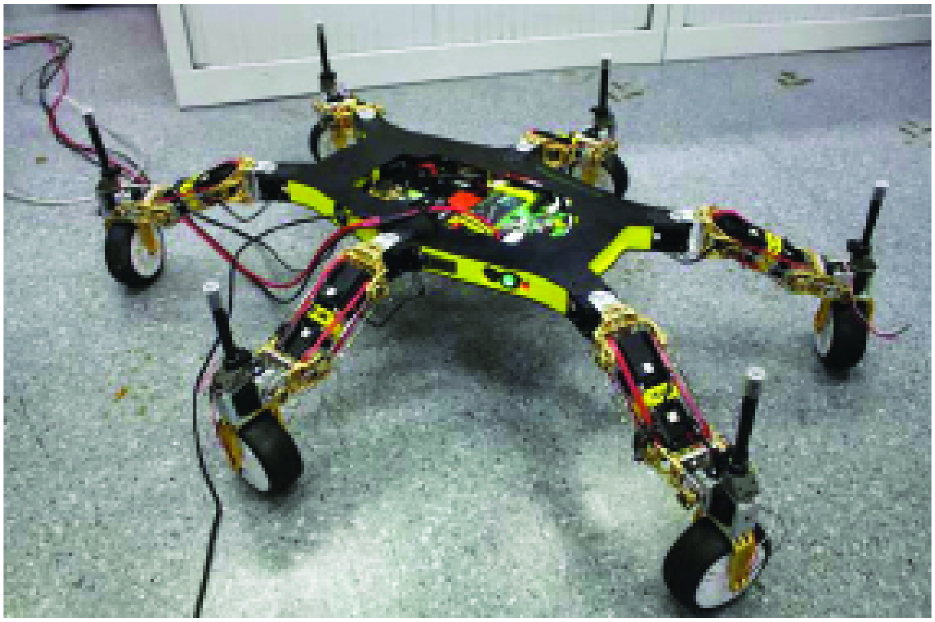
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[illegible]John T. Consoli

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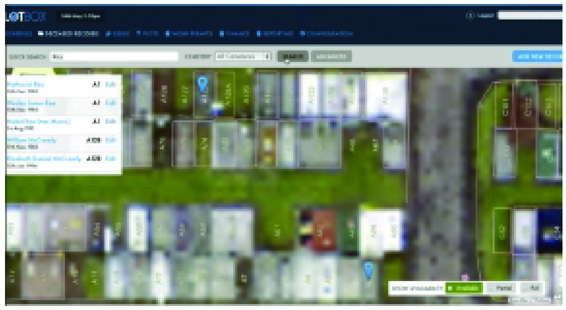
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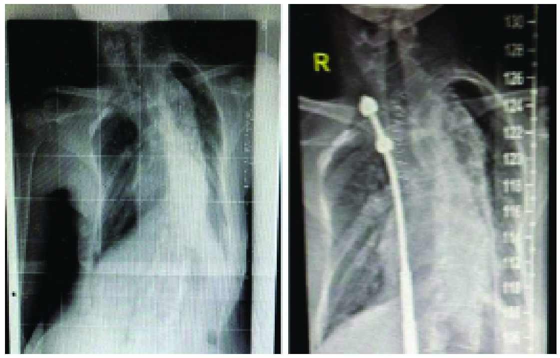
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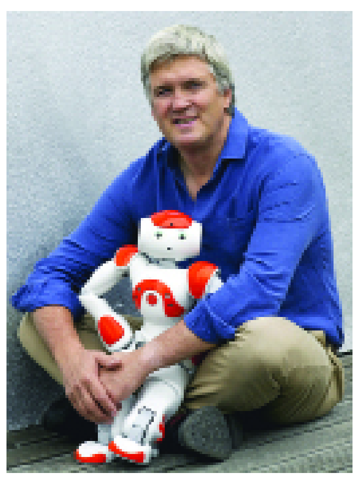


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Maisonnier[illegible]Masayoshi Son[illegible]SoftBank Robotics[illegible]2015[illegible]3[illegible]4[illegible]

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Ellipse (http://ellipse-tech.com/) □□□ MAGEC (MAGnetic Expansion Control) □□□□□□□□□□□□□□□□□□MAGEC□□□□□□□□□□□□□□□□ERC□□□□□□□□□□□ MAGEC□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□/□□□□□□□□□□□□□□□□□□4.5□□□5.5□□□□□MAGEC□□□□

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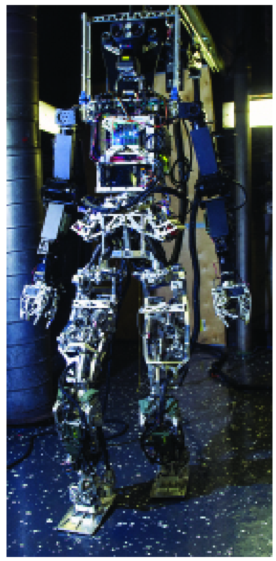
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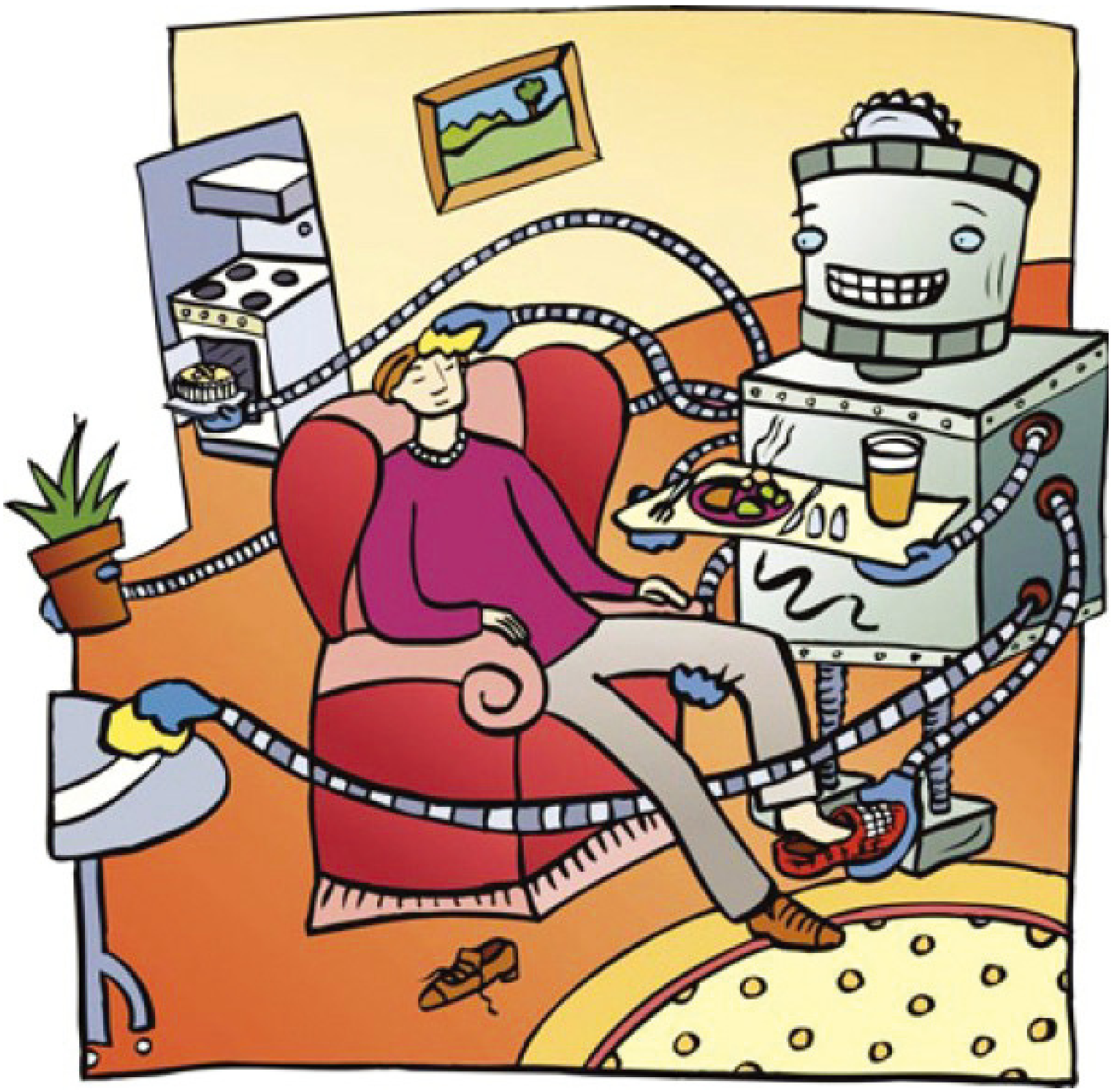
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ASIMO
HONDA


SCIENTIFIC AMERICAN
JANUARY 2007
WWW.SCIAM.COM
If This Is a PLANET, Then Why Isn't Pluto?
DAWN OF THE AGE OF ROBOTS
Bill Gates writes that every home will soon have smart mobile devices

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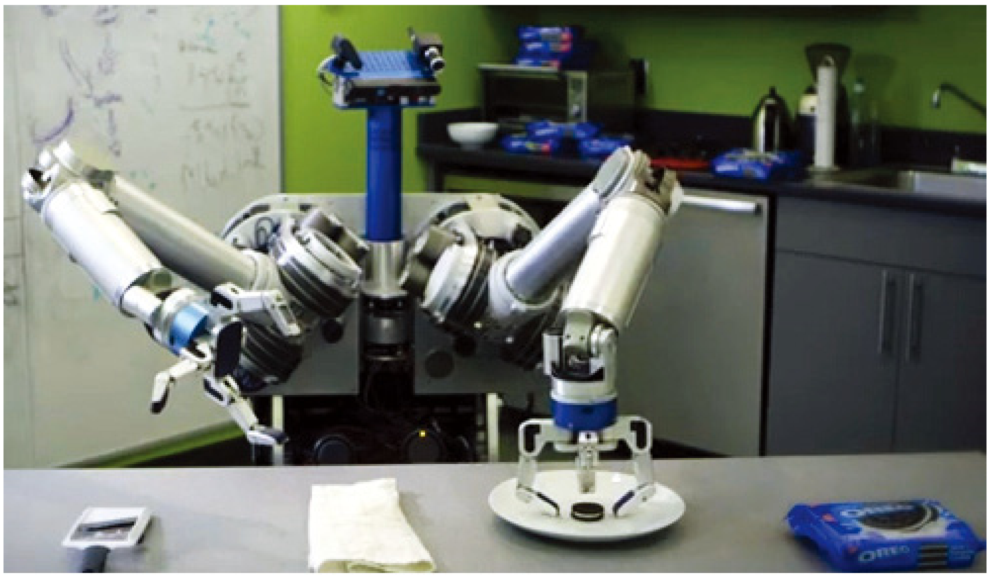
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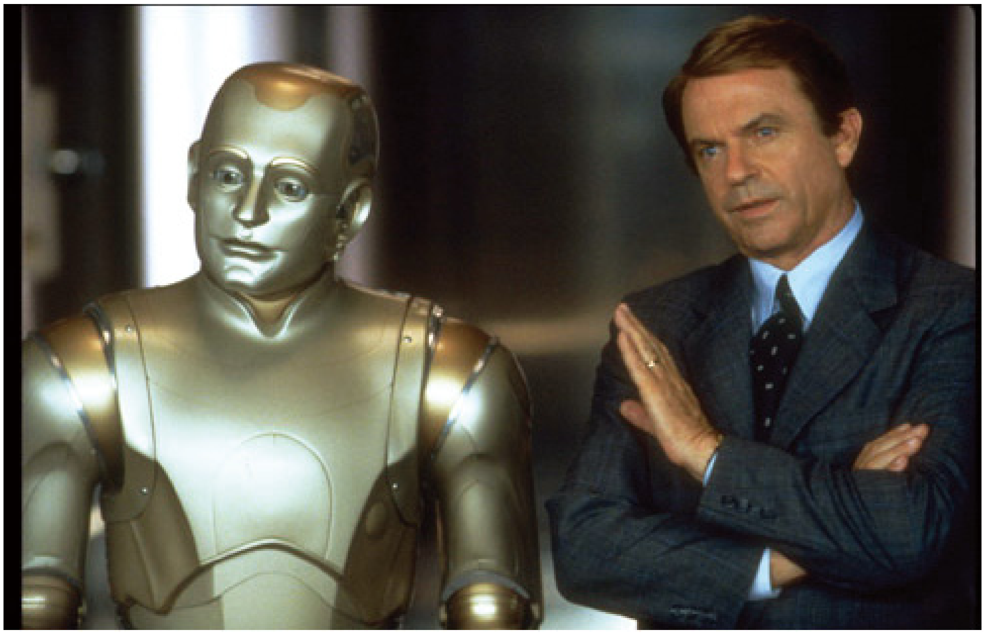
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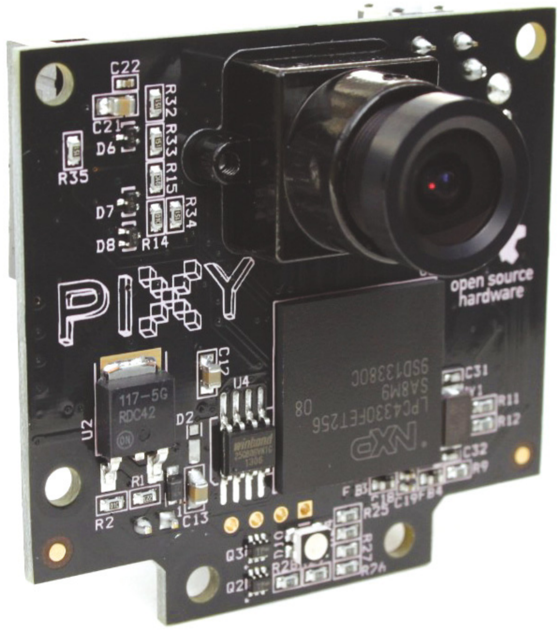
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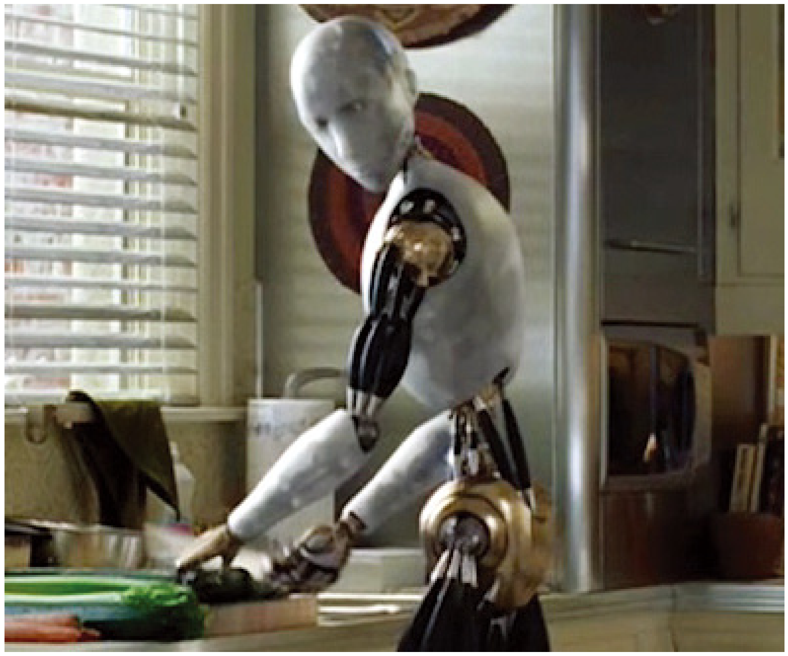
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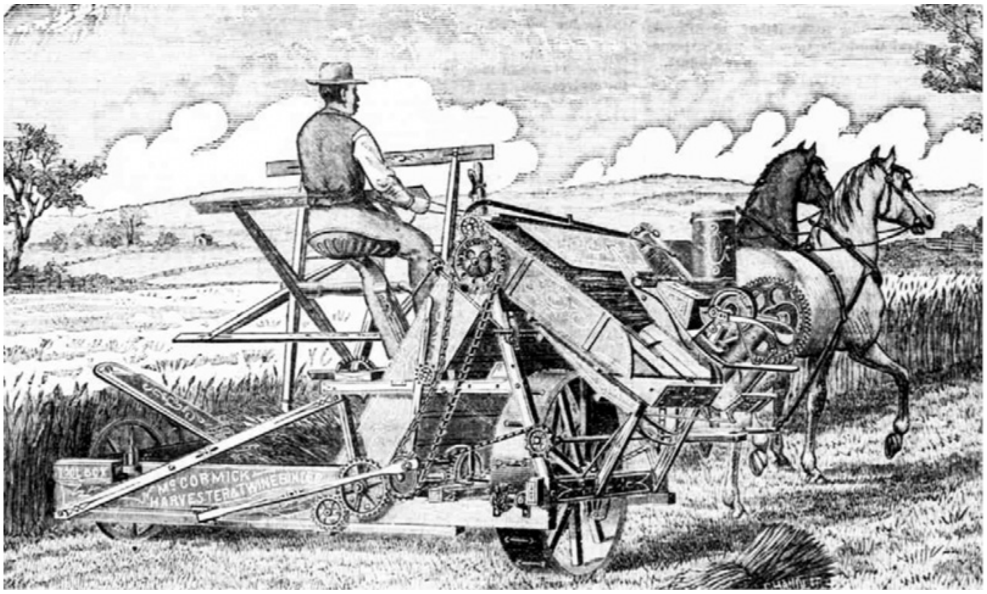
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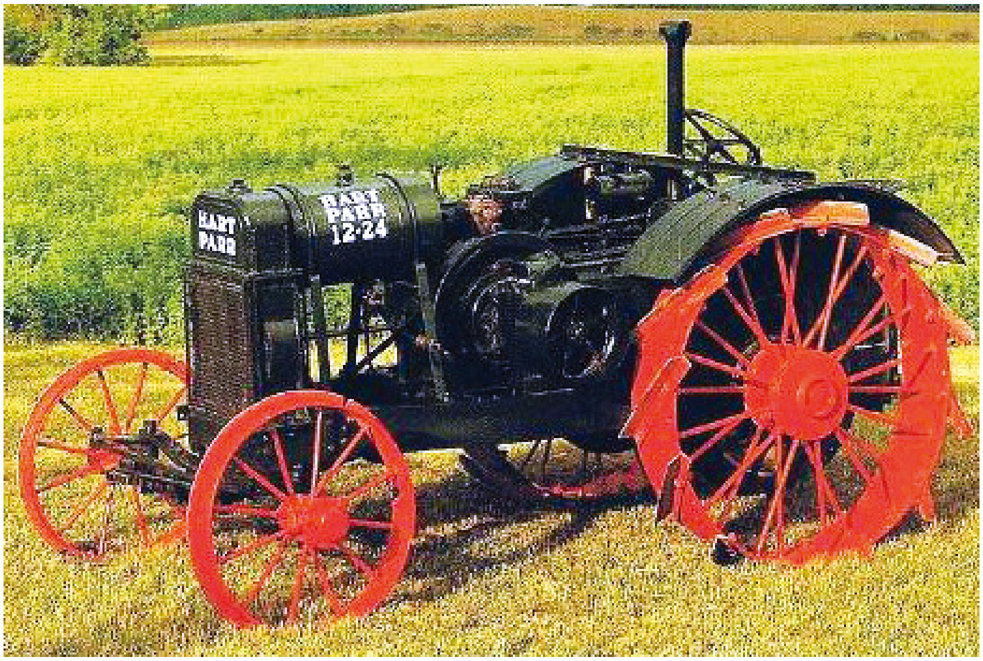
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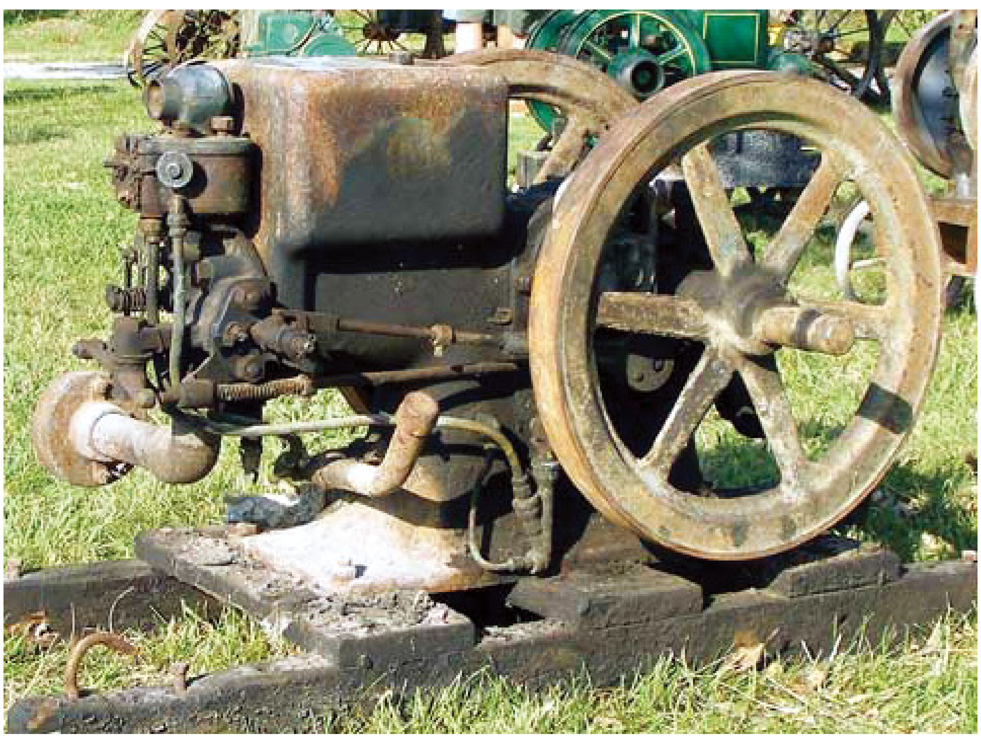
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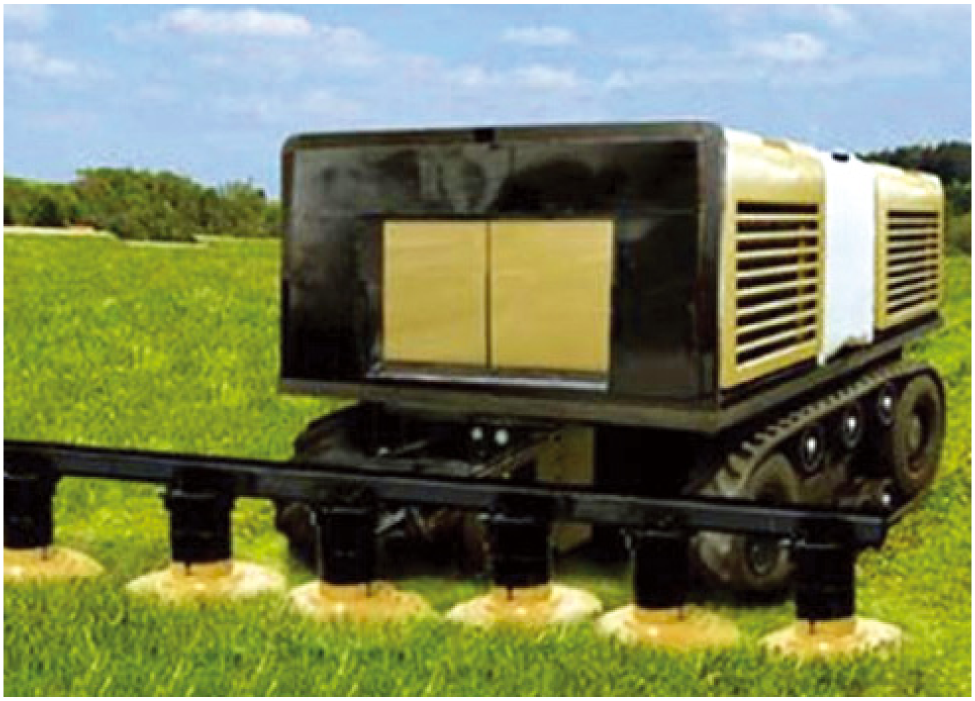
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10[illegible]Spirit[illegible]

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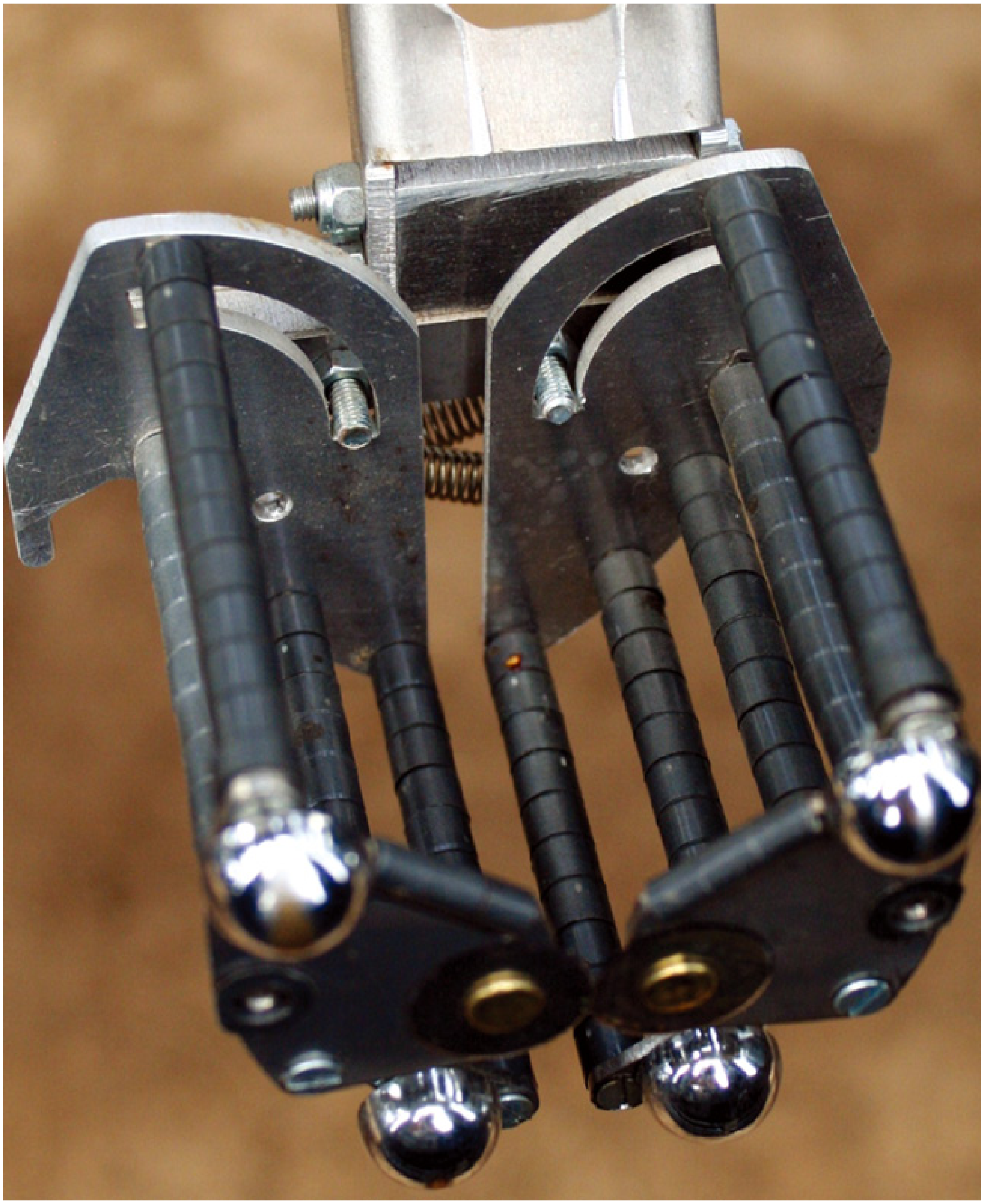
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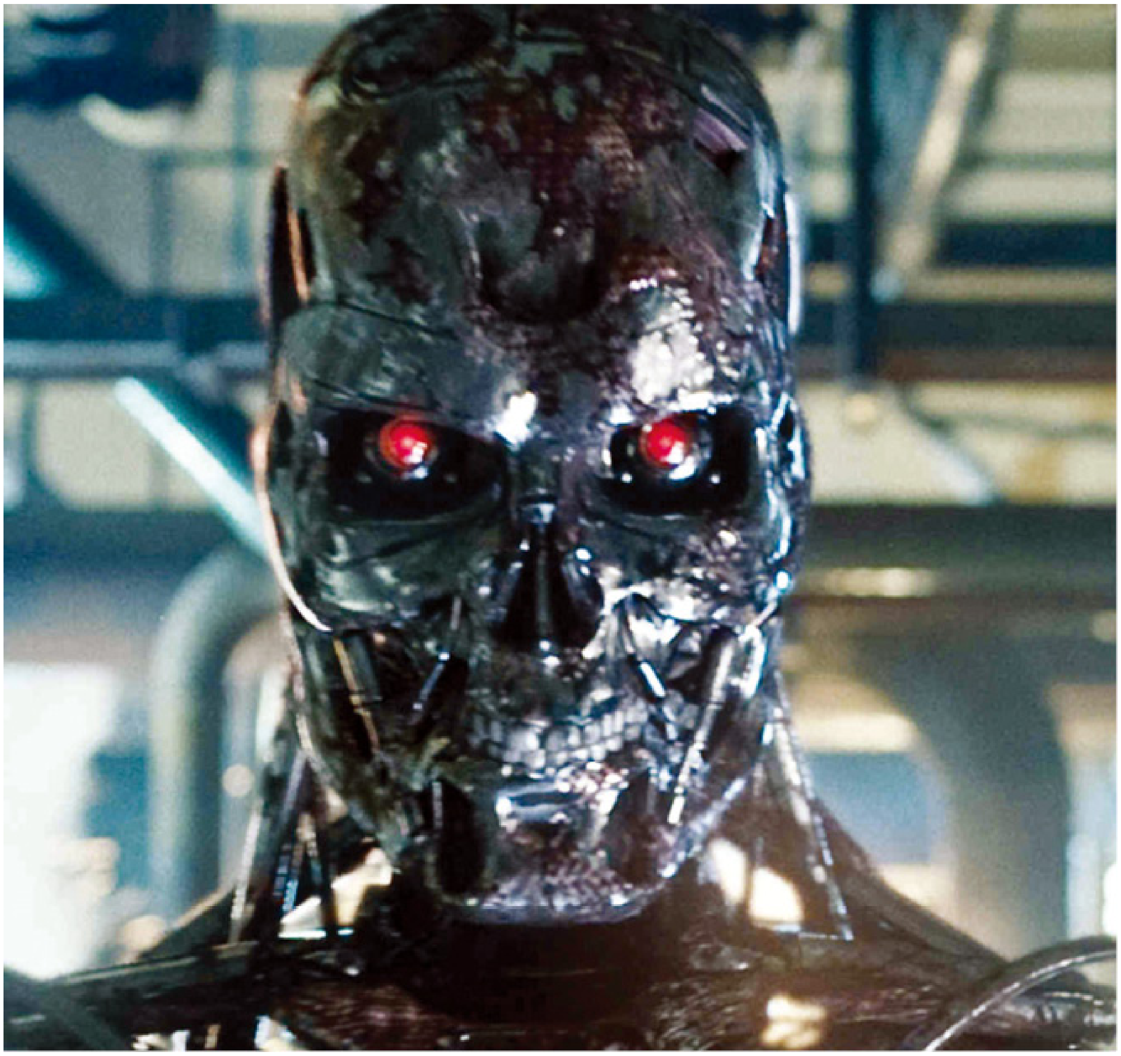
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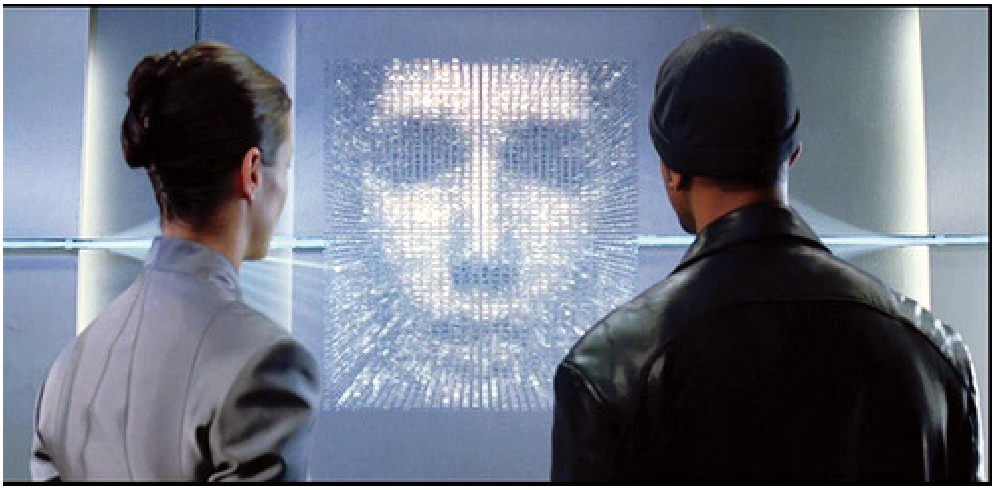


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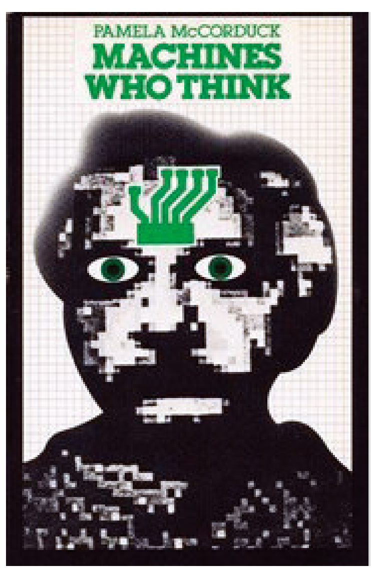


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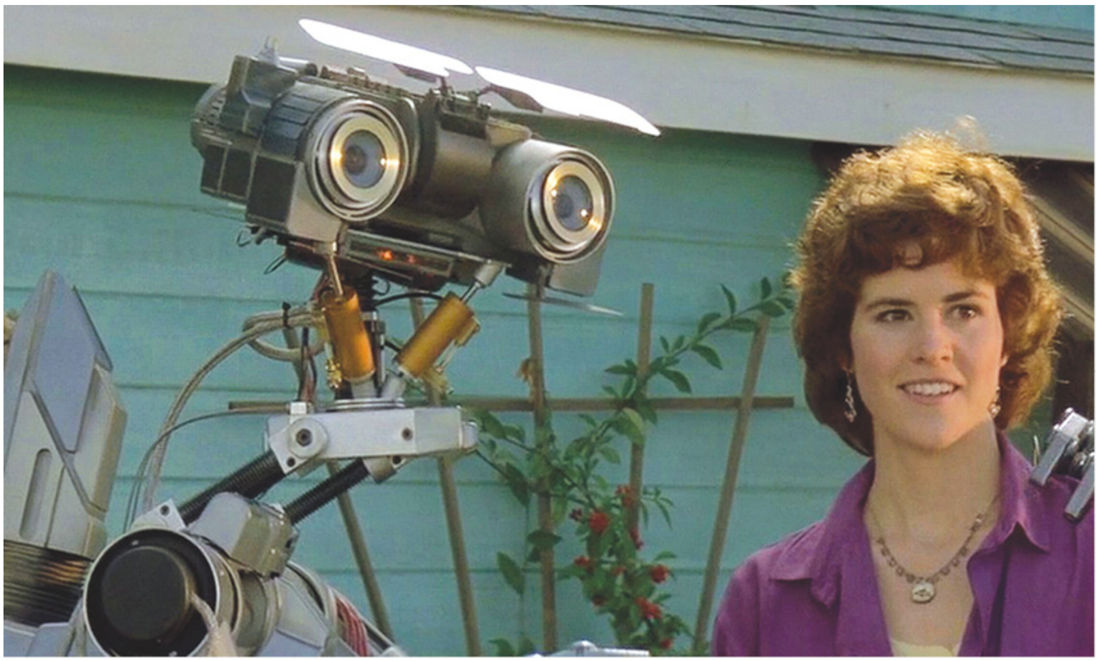
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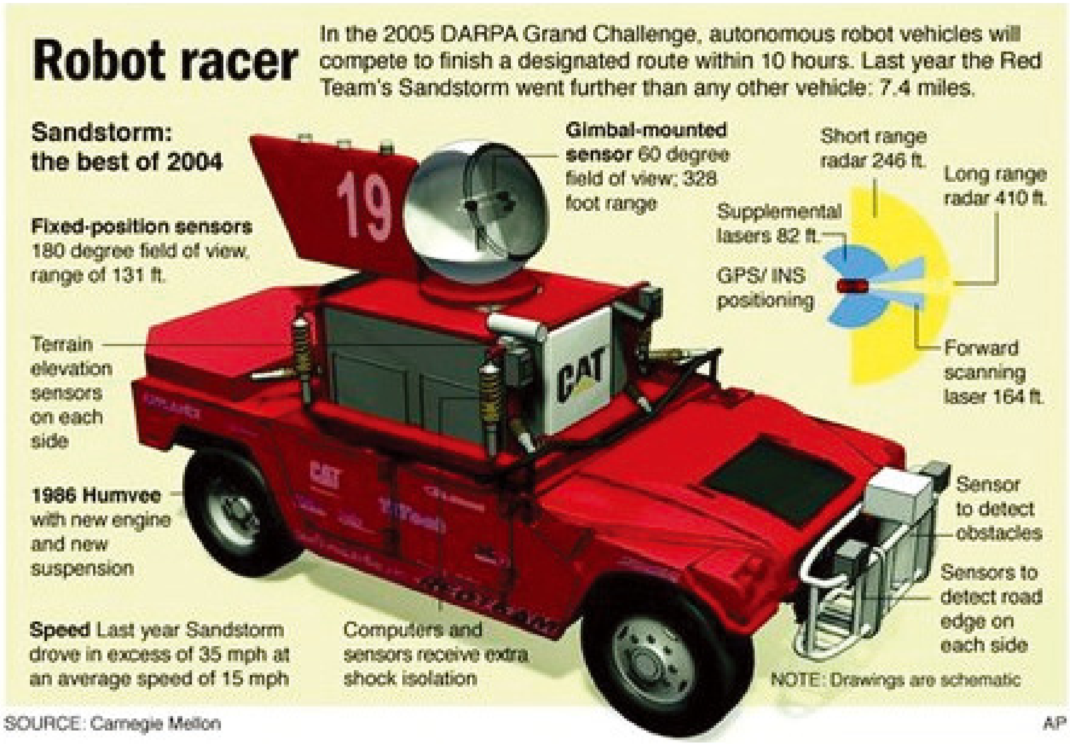
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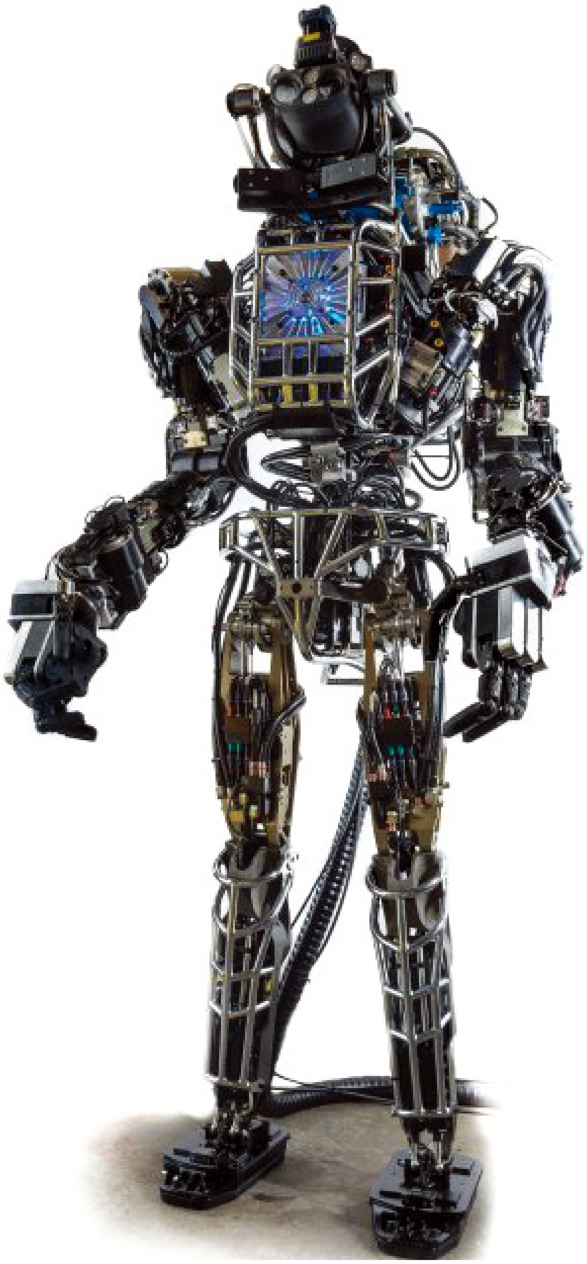
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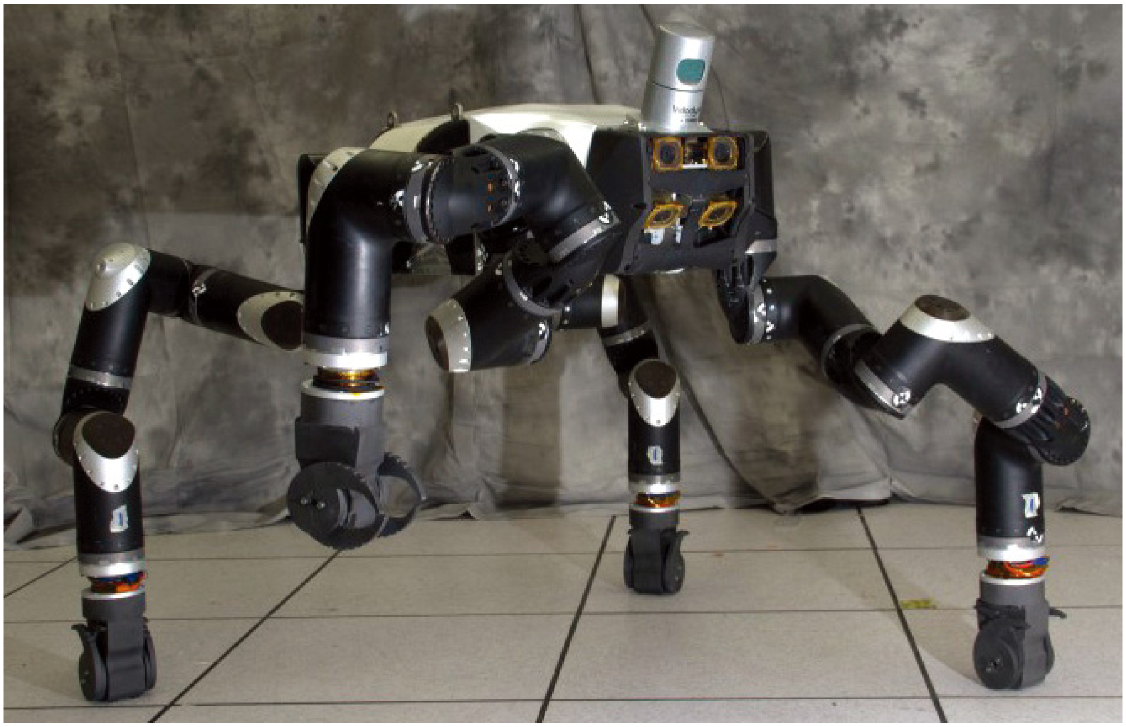


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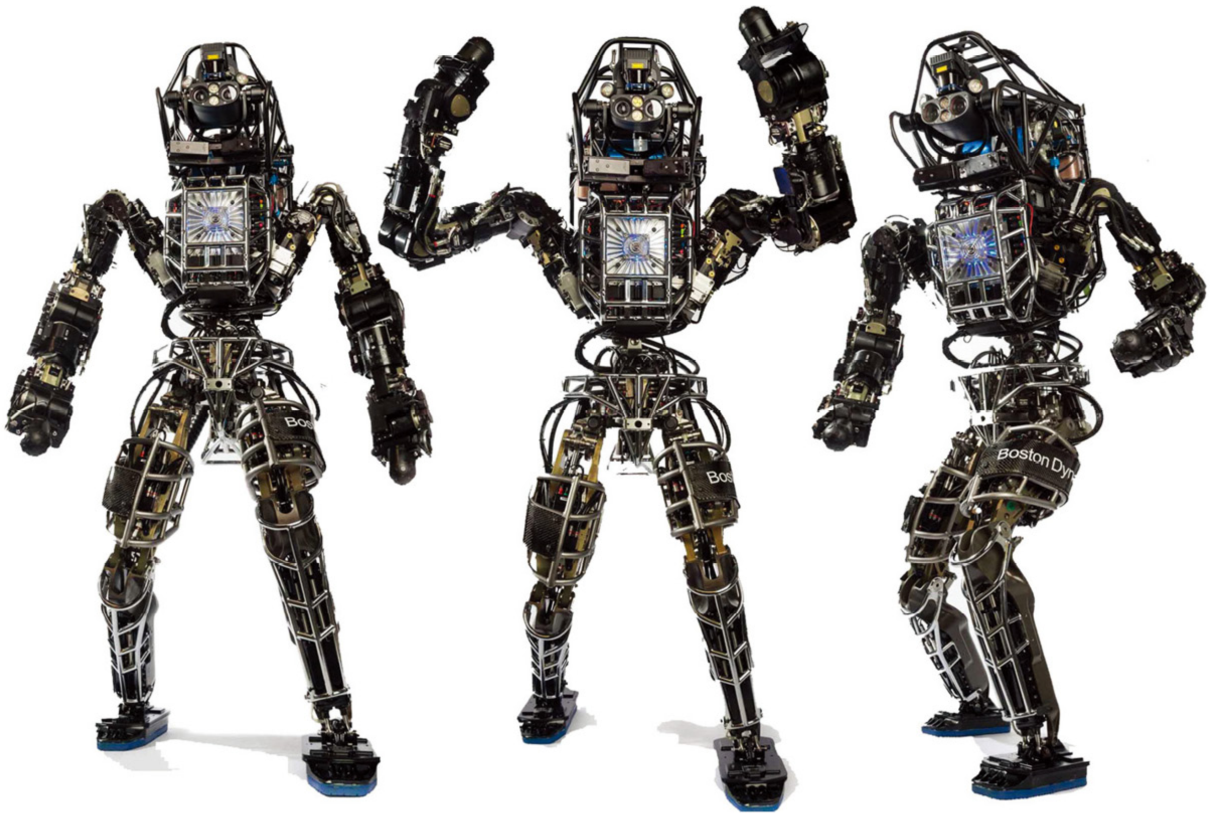
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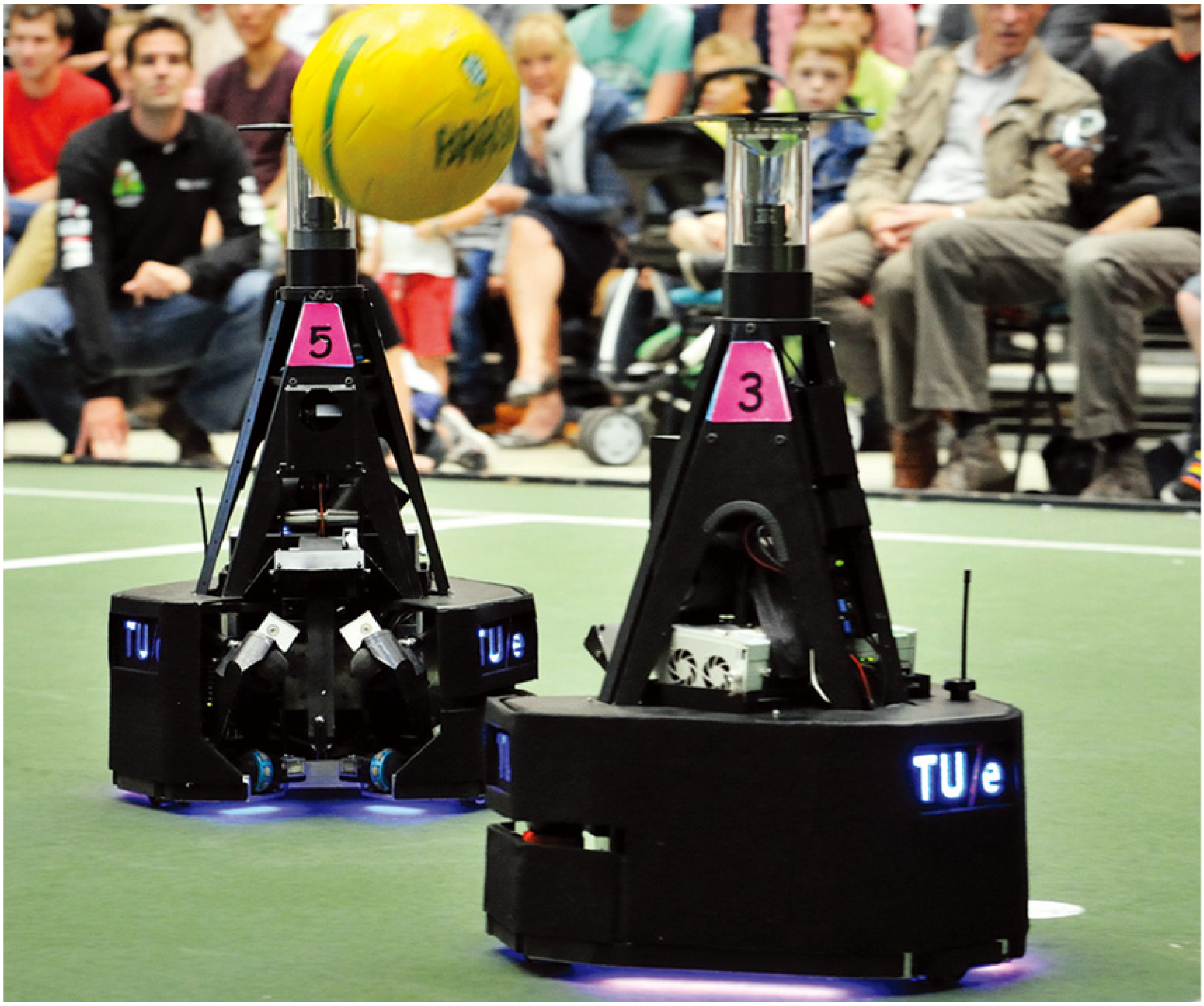
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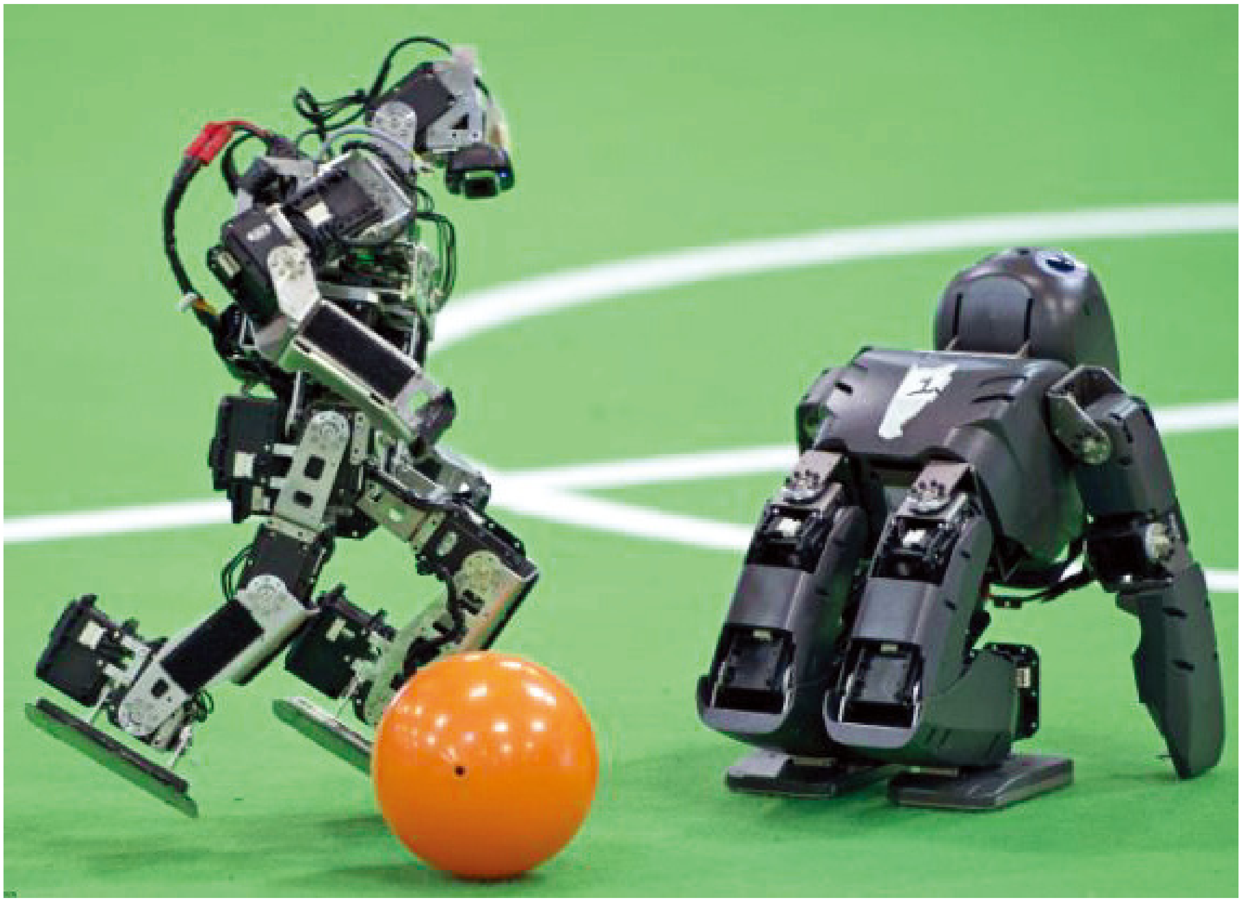
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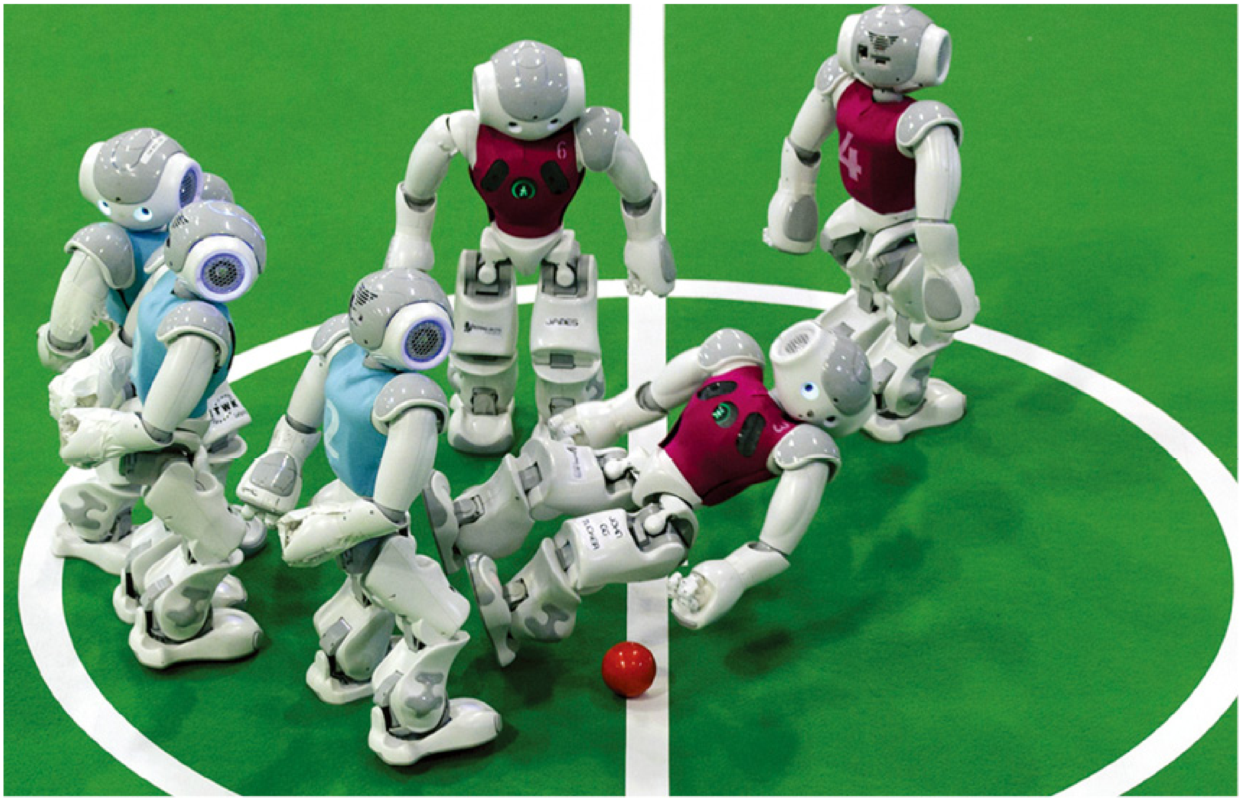
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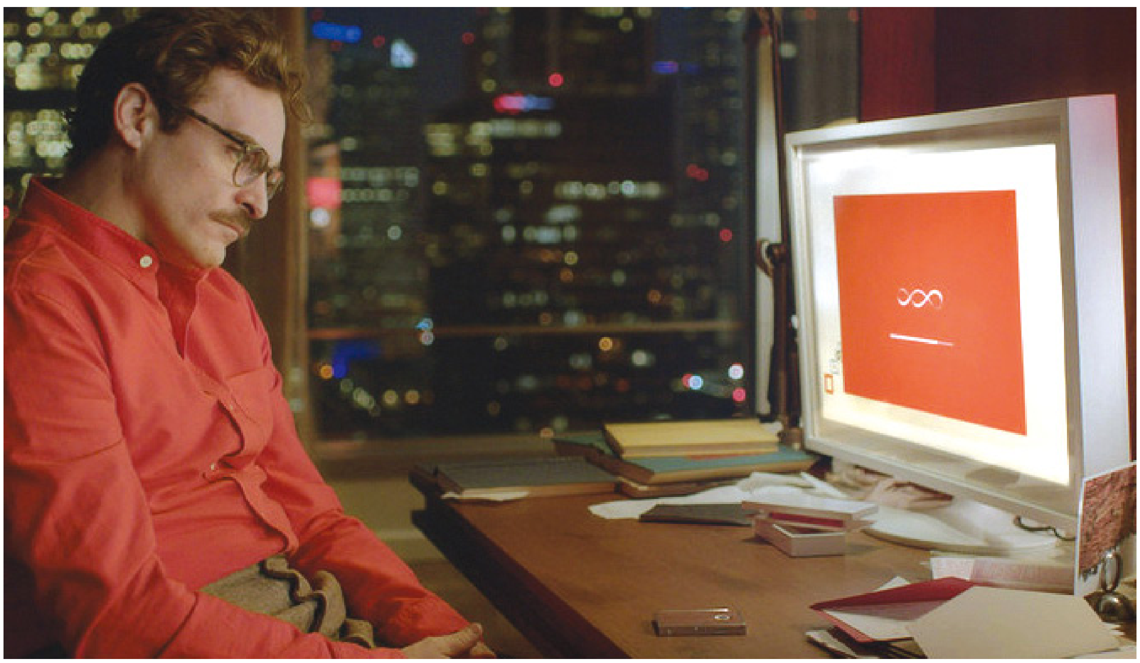
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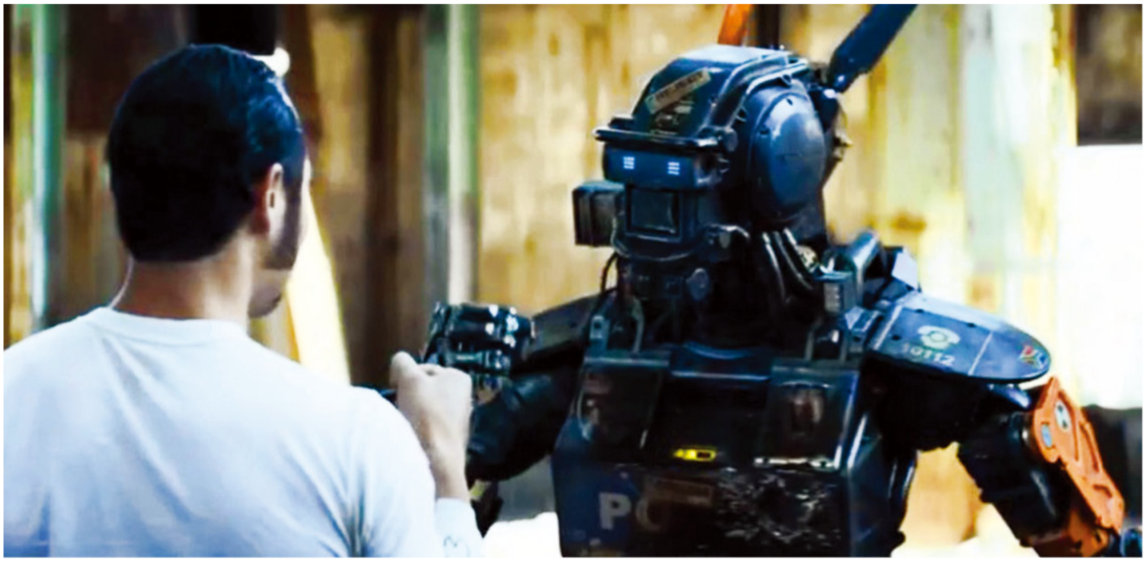
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□16 Joaquin Phoenix□□□Her□□□□



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□□RB-5x□□□□□□□□□□□□□□□□□□□□□□□□□□4□□TOPO□



□3　Working Woman□□□□□RB-5x□□□



□4　Androbot TOPO□□Pong□□□□Nolan Bushnell□□

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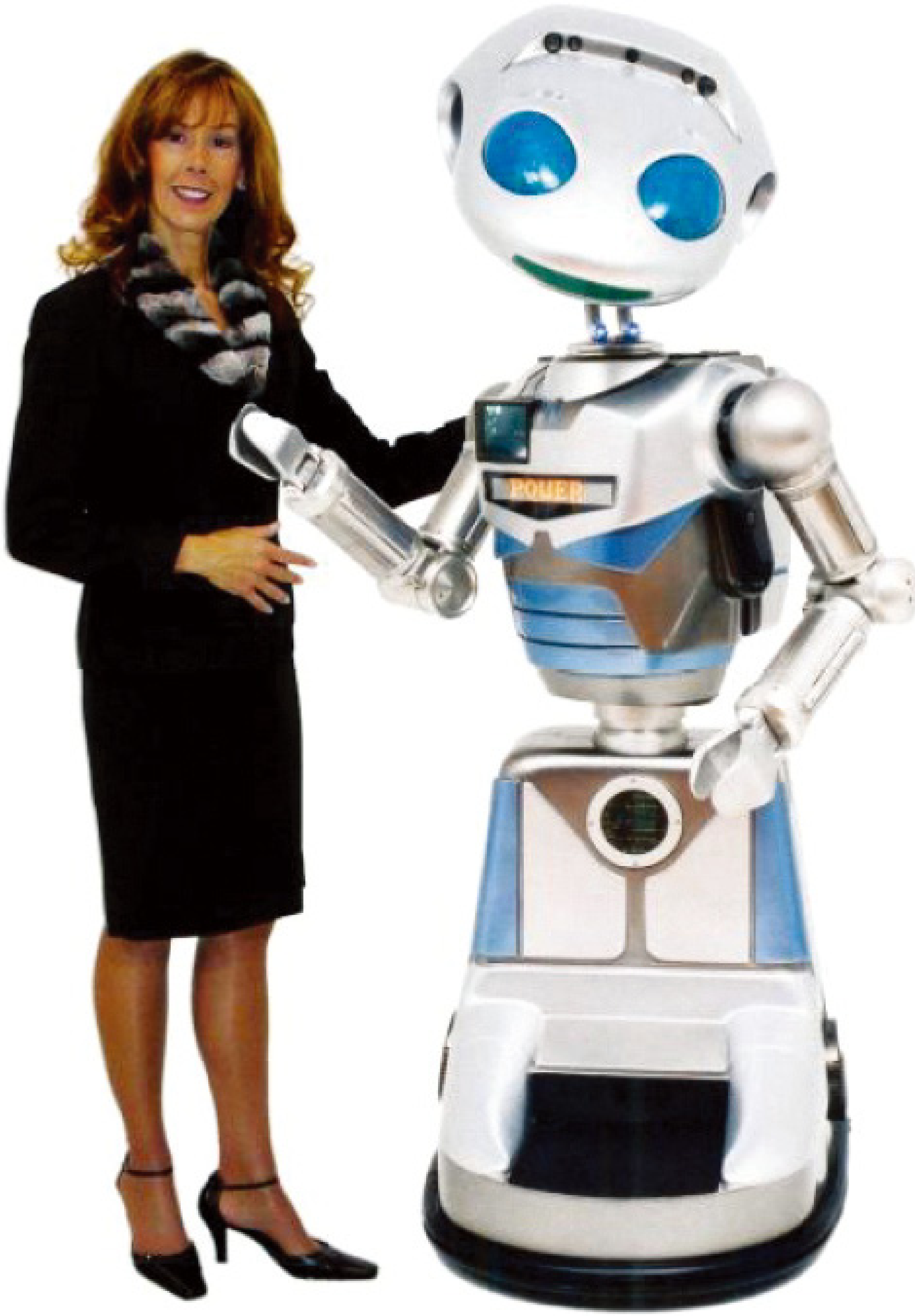


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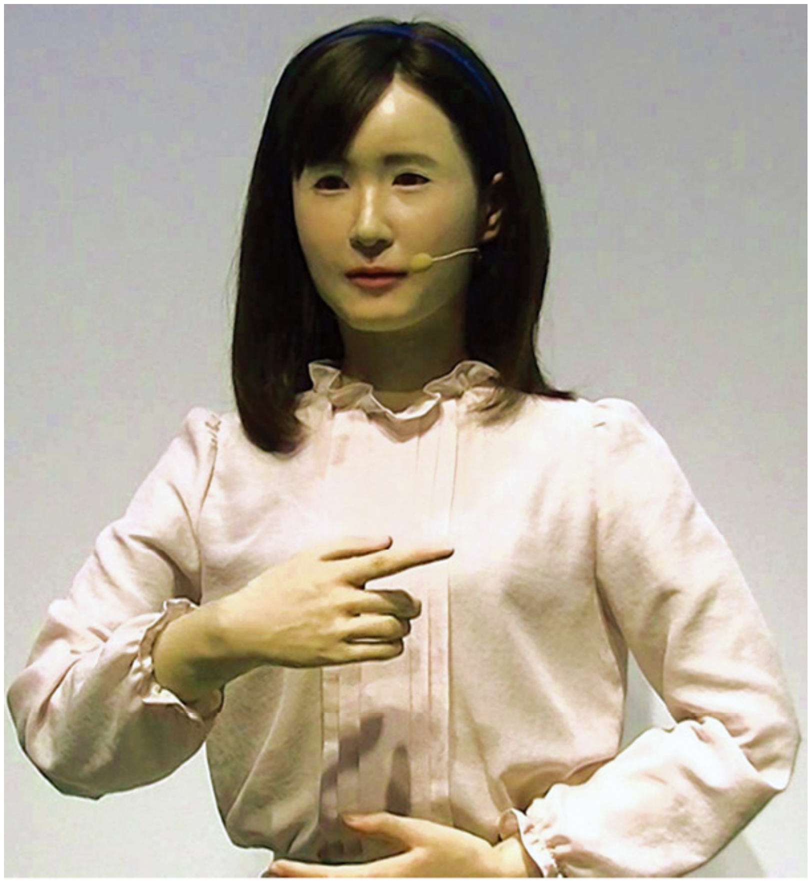
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□6　International Robotic□□□□□□□□□□□SICO

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Keeker

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□11　Mercedes-Benz□F 015□Cambot.

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Fraunhofer□□□□Care-O-bot□□□

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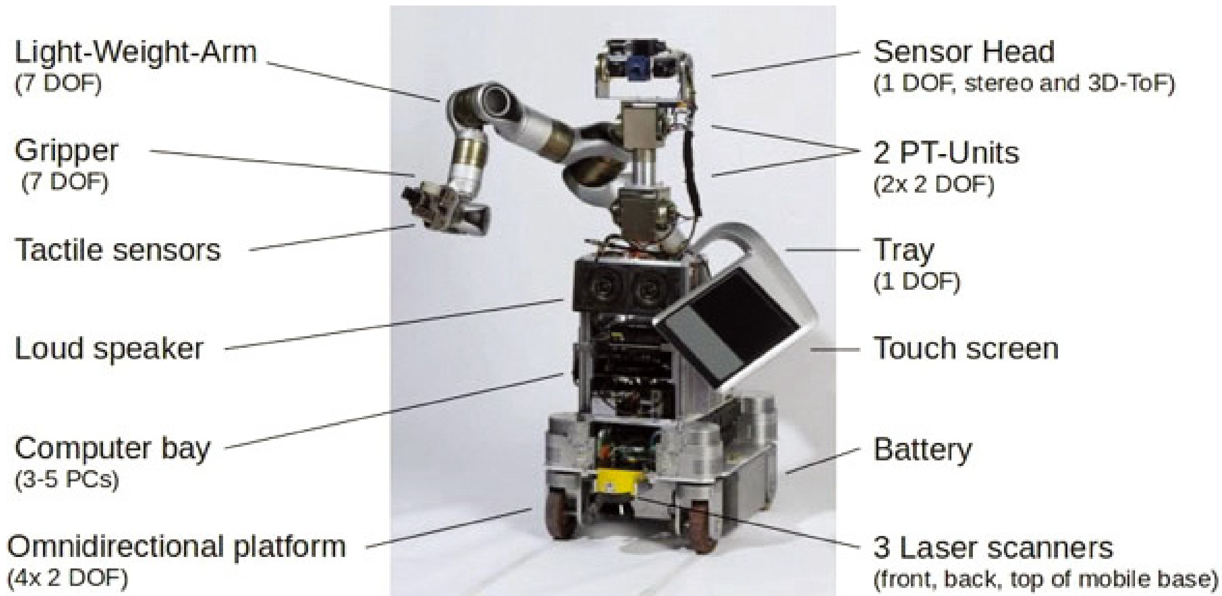
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□19　Care-O-bot 3□□□□□□□□□□

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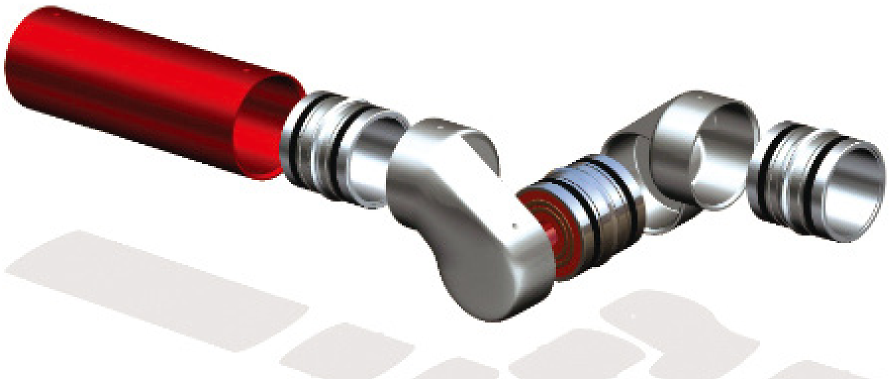
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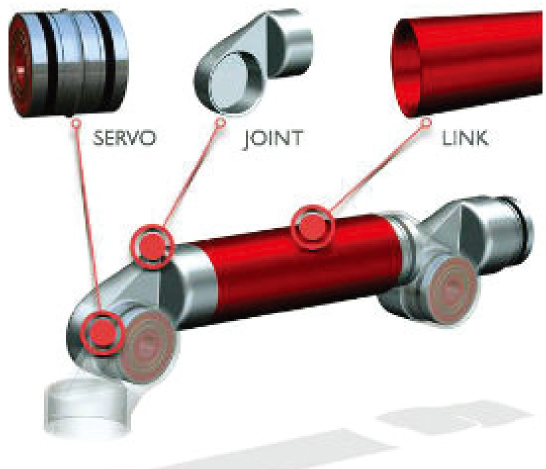
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□25　Modbot□□□□□



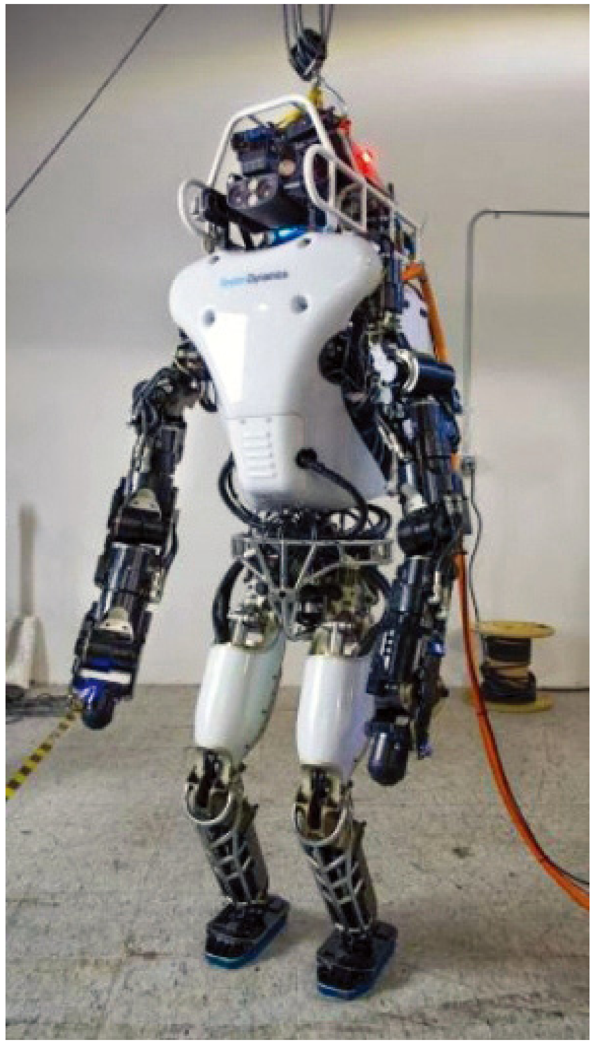
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3.1 [illegible]

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3.2 [illegible]

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3.3 [illegible]

Wi-Fi

IP

3.4

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> “[illegible]”[1][illegible]Best Buy [2][illegible]“[illegible]”[illegible]“[illegible]”[illegible]

3.5 [illegible]

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3.6 [illegible]

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[1] [illegible]smart[illegible]smart grid[illegible]smart city[illegible]——[illegible]

[2] Best Buy[illegible]——[illegible]

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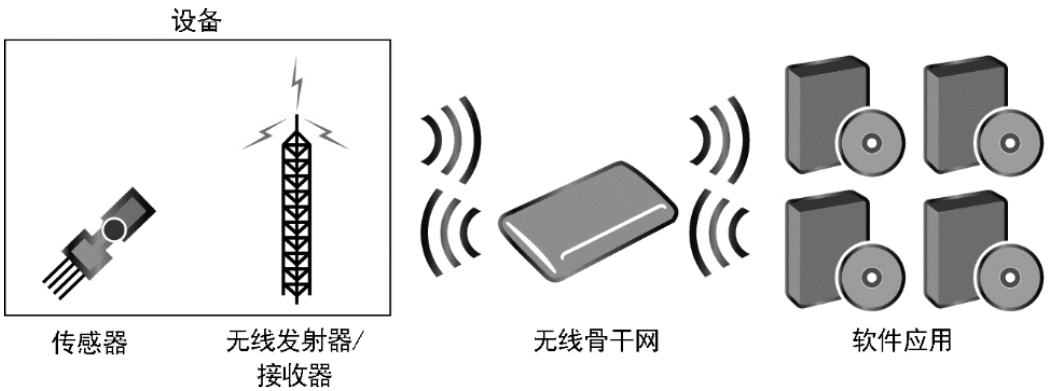
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4.2.1 [illegible]

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4.2.2 [illegible]

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[illegible] Google [illegible] A [illegible] B [illegible] C [illegible] D [illegible]

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4.2.3 [illegible]

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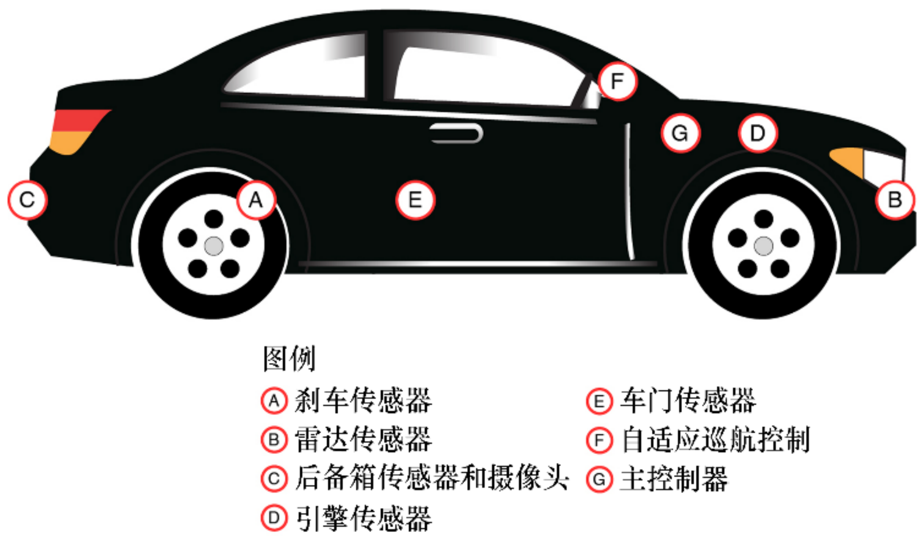
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4.3.3 [illegible]

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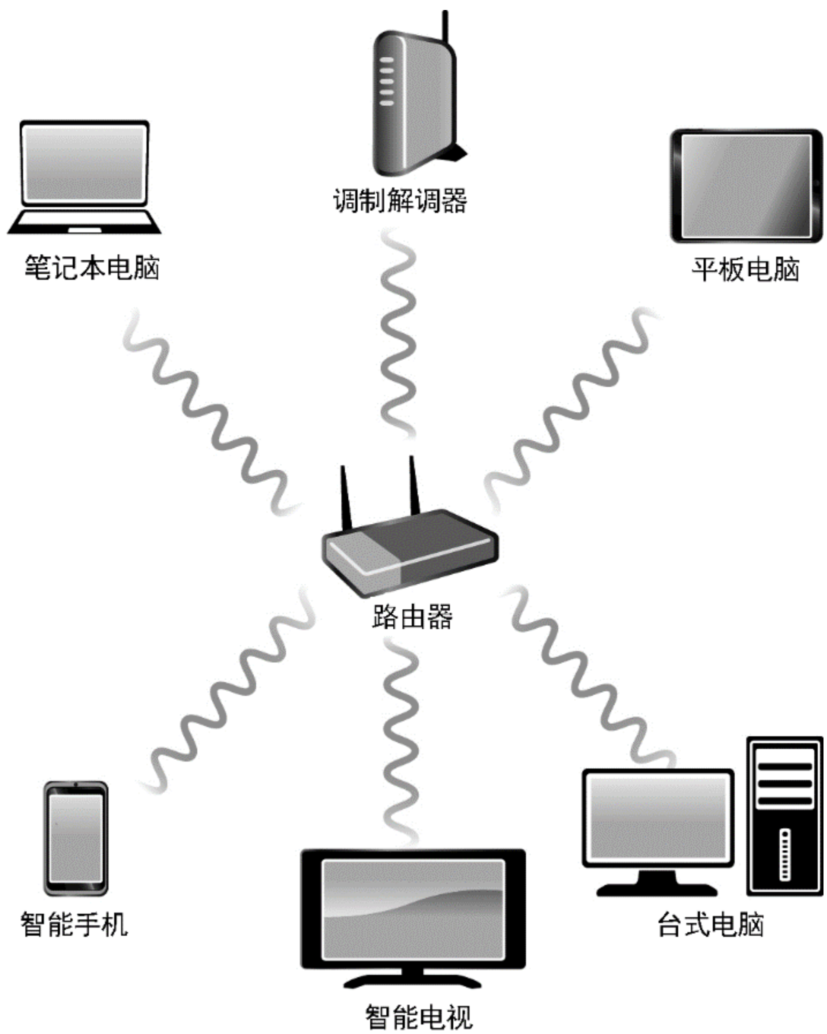
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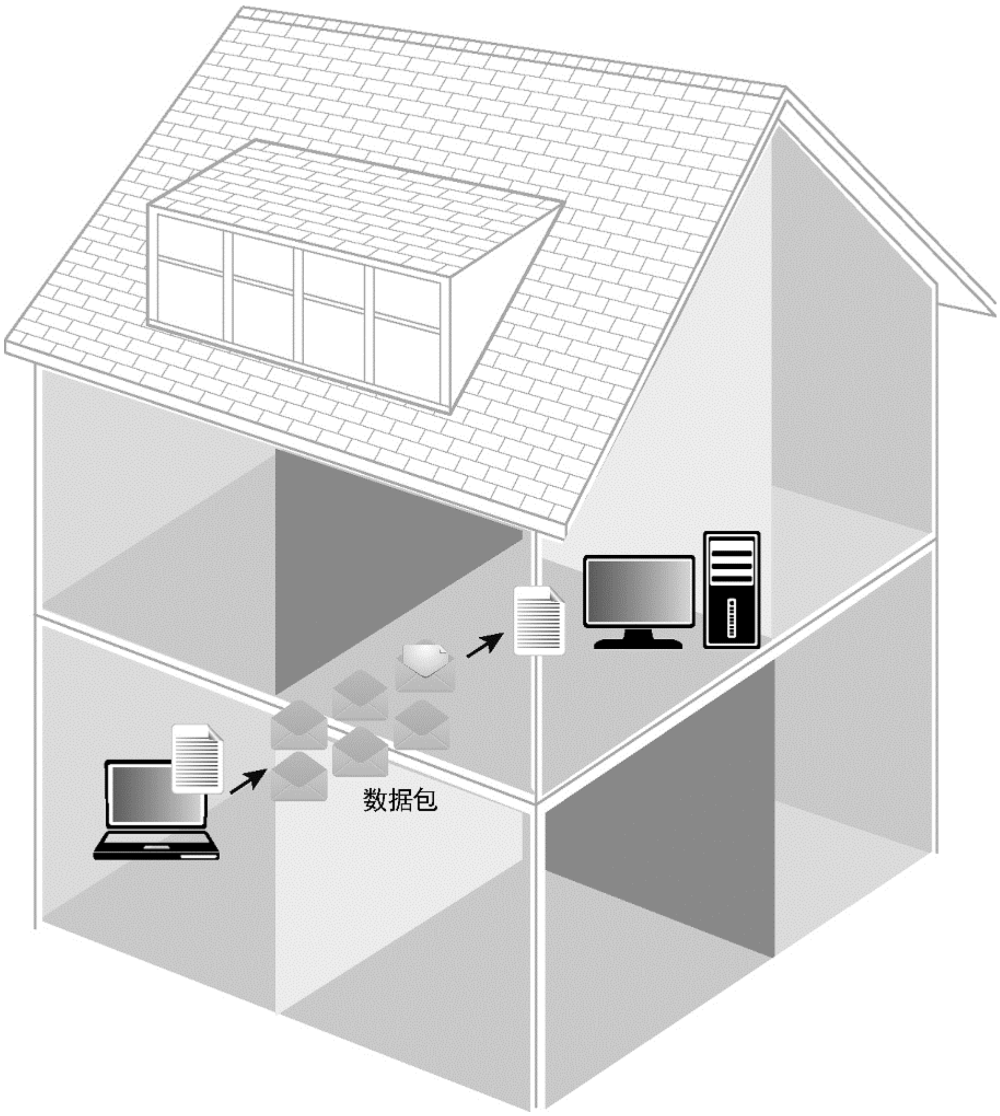
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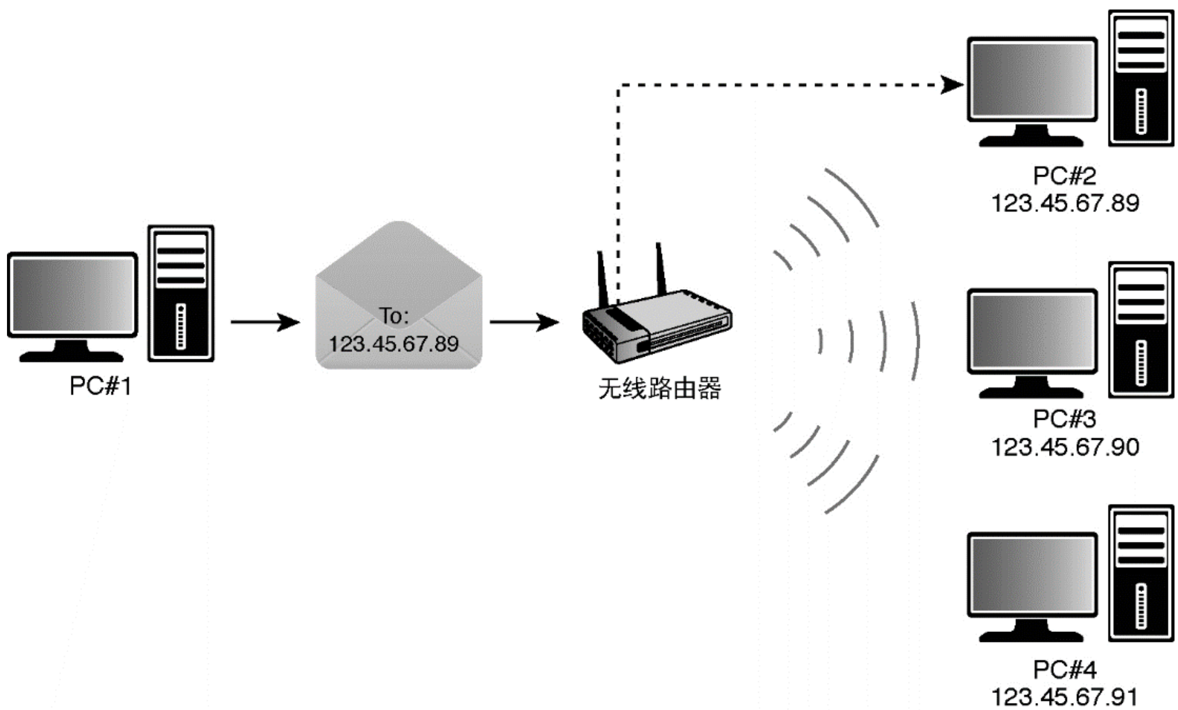
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为了解决这个问题，工程师们早在多年前就开始着手准备新一代的互联网协议。现在广泛使用的IP地址格式——也就是我们说的IPv4（第四版IP协议，第4代版本）——在IPv4体系下只有43亿个地址可供分配，而全球联网设备的数量早已远超这个数字。

新一代协议被称为互联网协议第六版，简称IPv6。你可能会好奇为什么从第4版直接跳到第6版。简单来说，它提供了大约340万100亿的11次方个地址——也就是340涧个地址。这个数字大到足以给地球上每一粒沙子都分配一个地址。目前IPv6正在逐步推广，与旧协议并行运行。

提示

IPv6地址由原来32位扩展为现在的128位，地址空间的扩大不仅仅是增加了3倍，而是增长了2的96次方倍。用12个数字来表示——当然这只是一个简化说法，实际计算远比这复杂。

4.5 无线通信基础

在了解了互联网的基本运作原理后，我们来看看另一个同样重要的话题：无线通信。如今，我们的生活已经离不开各种无线技术，从手机到无线网络，无处不在。

无线通信的本质是利用电磁波在空间中传播信息。我们日常收听的广播电台就是一个典型例子。你可能注意到收音机上有AM和FM两个波段，它们代表了不同的调制方式。AM/FM广播是最早普及的无线通信形式之一，至今仍在广泛使用。

4.5.1 无线电频率

无线电频率（Radio Frequency，RF）是指用于无线通信的电磁波频率范围。每一种无线设备都在特定的频率上工作，就像每个广播电台都有自己的频道一样。频率决定了信号能传多远、能穿透什么障碍物，以及能携带多少数据。

频率的单位是赫兹，表示每秒钟波动的次数。频率越高，波长越短；频率越低，波长越长。不同频率的电磁波有着不同的特性和用途。

提示

电磁波包括无线电波、微波、红外线、可见光、紫外线、X射线等，它们本质相同，只是频率不同。

举个例子，当你把收音机调到某个电台时，你实际上是在选择一个特定的频率。比如93.5MHz，意思是每秒93500000次振动。MHz表示兆赫，100万赫；GHz表示吉赫，10亿赫。

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4.5.2 Wi-Fi

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[illegible]Wi-Fi[illegible]Wi-Fi[illegible]

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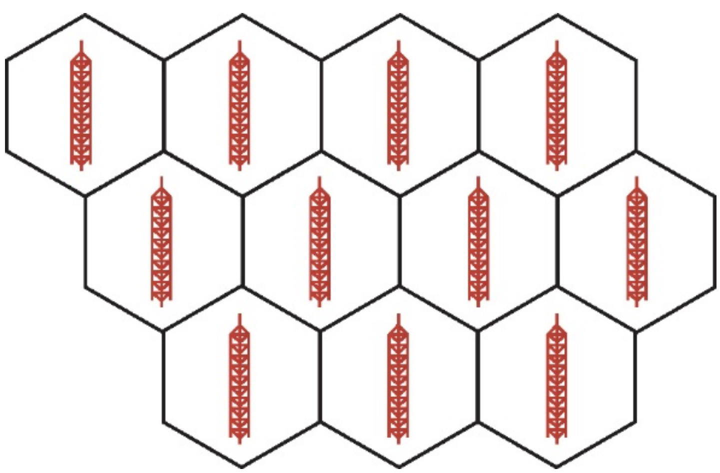
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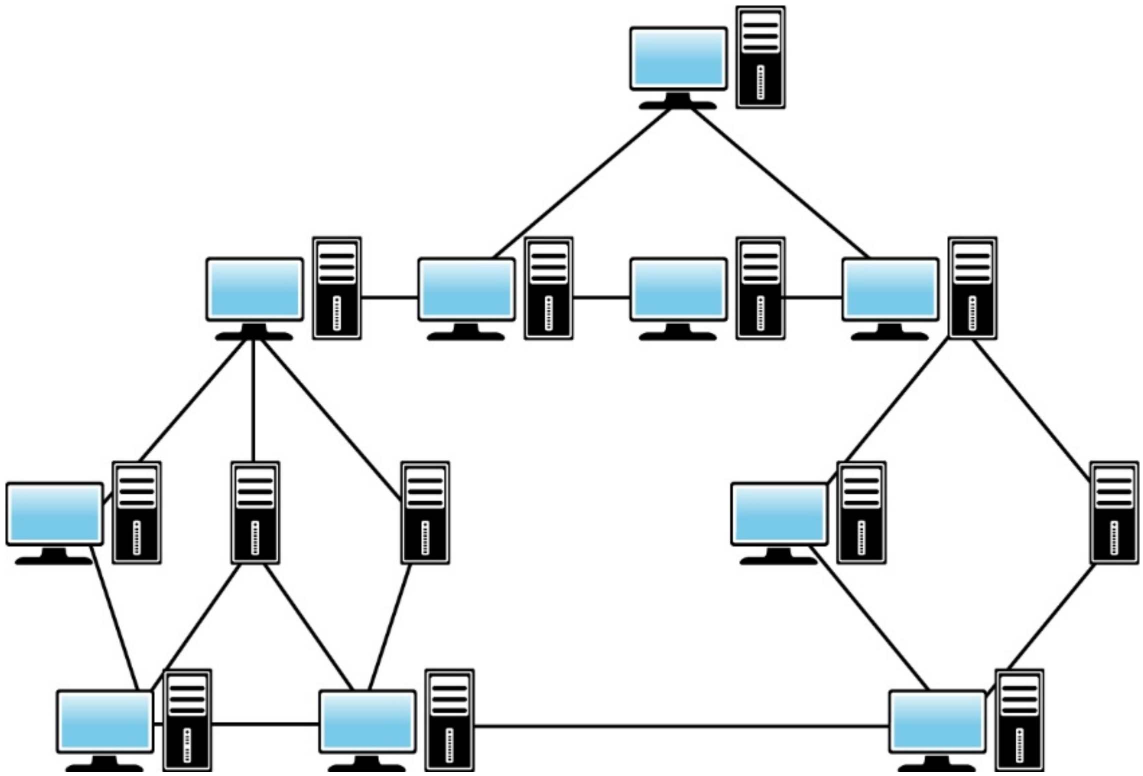
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- Bluetooth Special Interest Group□www.bluetooth.org□
- Cisco□www.cisco.com□
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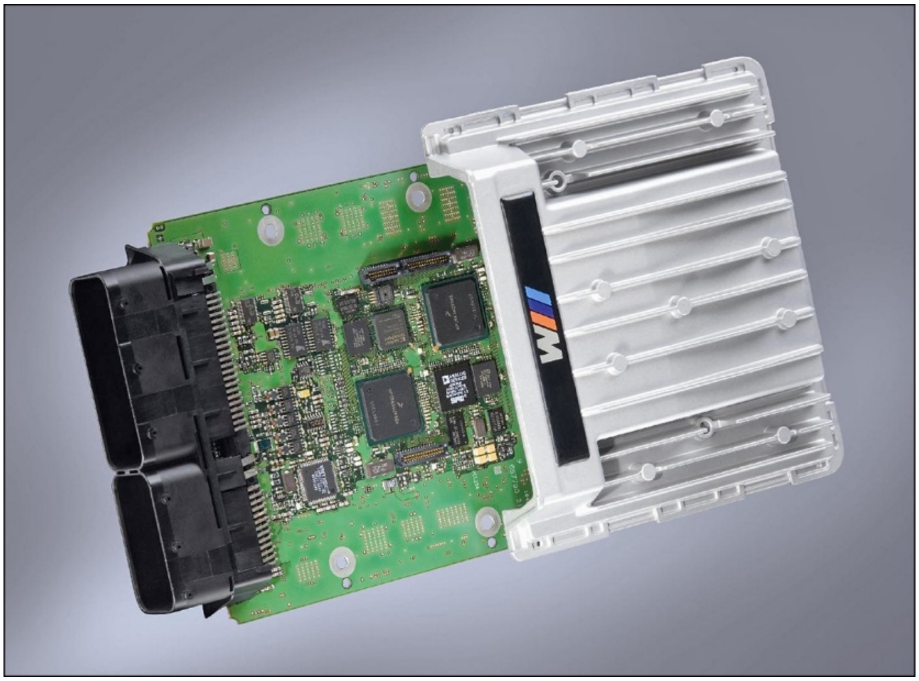
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[illegible]5.1 [illegible]BMW[illegible]

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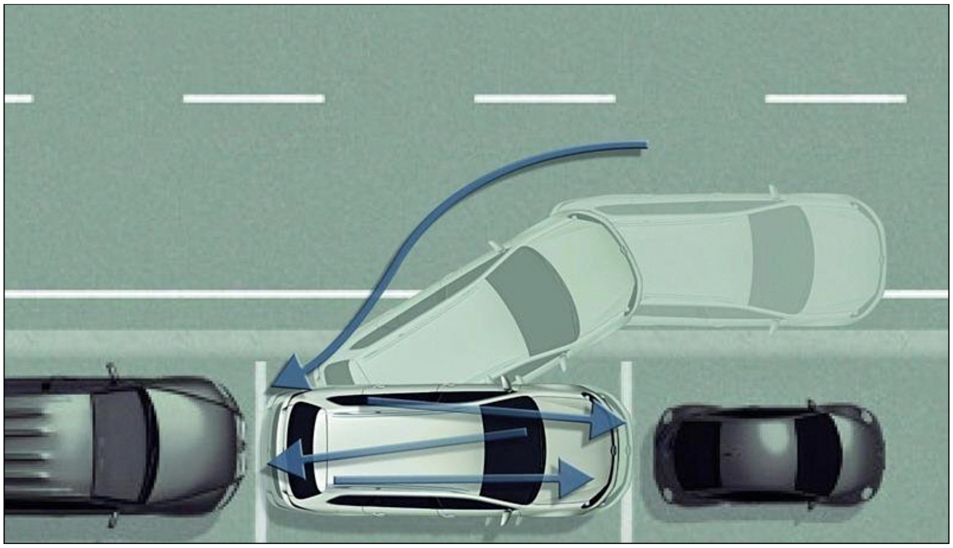
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[illegible]Park Assist[illegible]5.2[illegible]



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[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]NHTSA[illegible]80%[illegible]

5.1.5 [illegible]

[illegible]

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Apple[illegible]CarPlay[illegible]CarPlay[illegible]Apple[illegible]Siri[illegible]——[illegible]5.3[illegible]CarPlay[illegible]CarPlay[illegible]/[illegible]Apple Map[illegible][2][illegible]

Apple[illegible]CarPlay[illegible]CarPlay[illegible]2015[illegible]



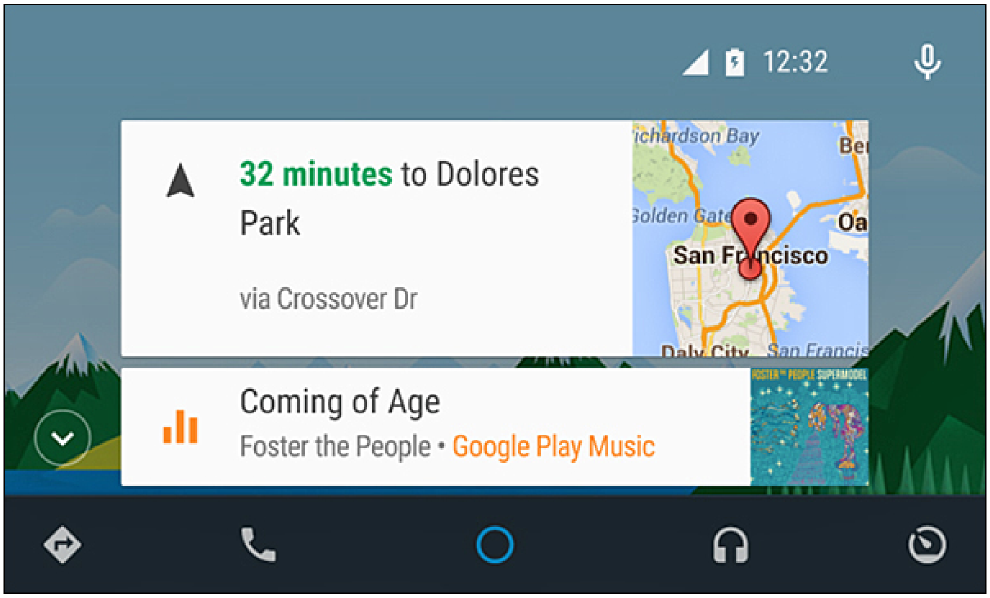
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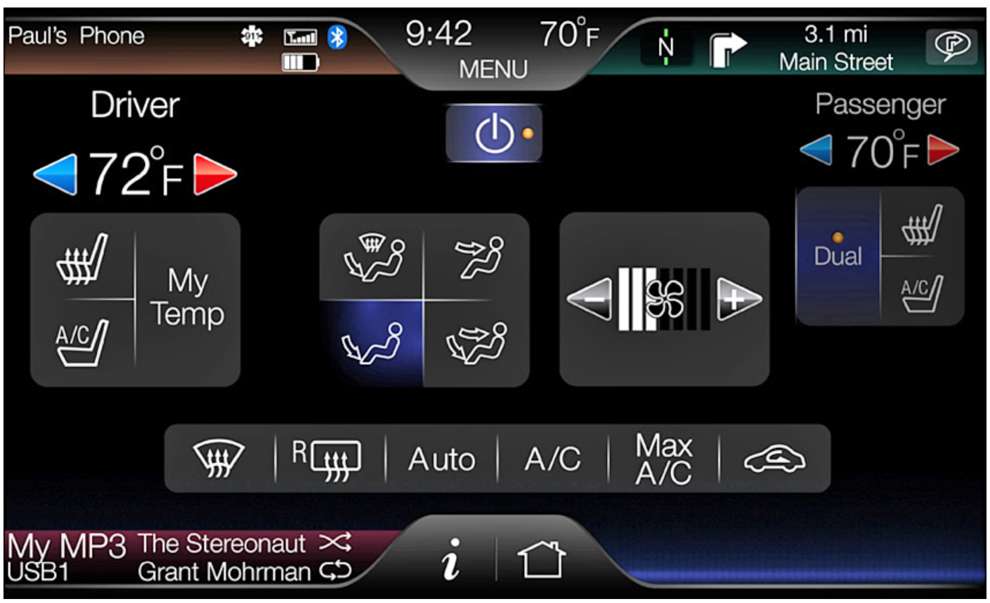
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5.1.6 [illegible]

[illegible]/[illegible]5.5[illegible]MyFord[illegible]/[illegible]



□5.4 Google□Android Auto□□



□5.5 MyFord□□□□□□□□□□□□□□

[illegible]

5.1.7 [illegible]

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Continental IBM Cisco Ford Toyota

OBD “ ” OBD-II
www.odbii.com

5.2

5.2.1

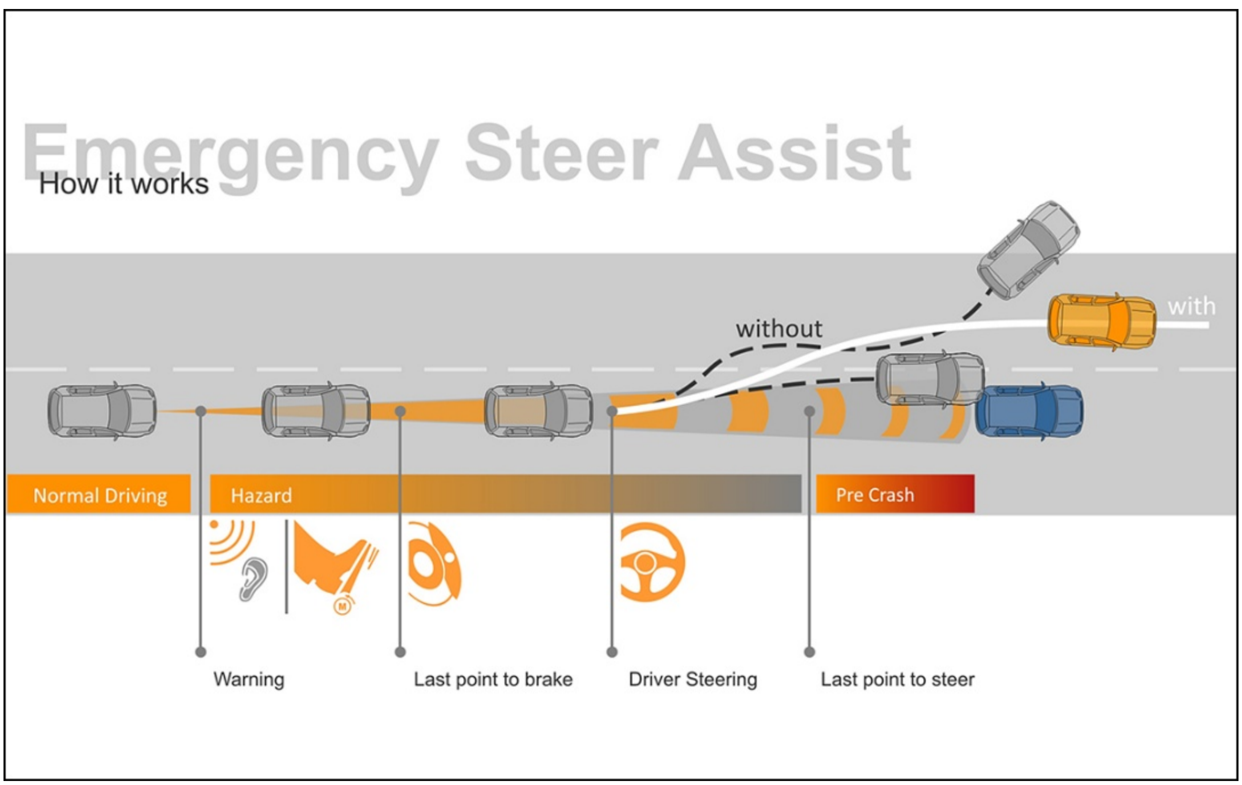
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5.2.2 [illegible]

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- [illegible]Autobahn Pilot[illegible]Highway Pilot[illegible]
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[illegible]5.7[illegible]Induct Technology[illegible]Navia[illegible]20[illegible]



[illegible]5.7 Navia[illegible]Induct Technology

5.2.3 [illegible]

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- 1[illegible]——[illegible]
- 2[illegible]——[illegible]2[illegible]
- 3[illegible]——[illegible]
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[illegible]4[illegible]10[illegible]

5.2.4 Google[illegible]

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Google[illegible]

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□5.8 Google□□□□□□□□□□□□□

[illegible]50[illegible]30[illegible]

[illegible]LIDAR[illegible]Velodyne 64-[illegible]360[illegible]1.3MB[illegible]LIDAR[illegible]100[illegible]

[illegible]

[illegible]200[illegible]6[illegible]

[illegible]1GB[illegible]

[illegible]Google[illegible]

5.3 [illegible]

[illegible]SUV[illegible]

5.3.1 [illegible]

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> [illegible]Uber[illegible]/[illegible]
> [illegible]Uber[illegible]75%[illegible]
> [illegible]
> [illegible]9000[illegible]

5.3.2 [illegible]

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- [illegible]——[illegible]

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- [illegible]——[illegible]
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5.3.3 [illegible]

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5.4

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> [illegible]“[illegible]”[illegible]20000[illegible]2014[illegible]Accord[illegible]
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> [illegible]

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[1] [illegible]——[illegible]

[2] Appled Map[illegible]——[illegible]

[illegible]6[illegible] [illegible]

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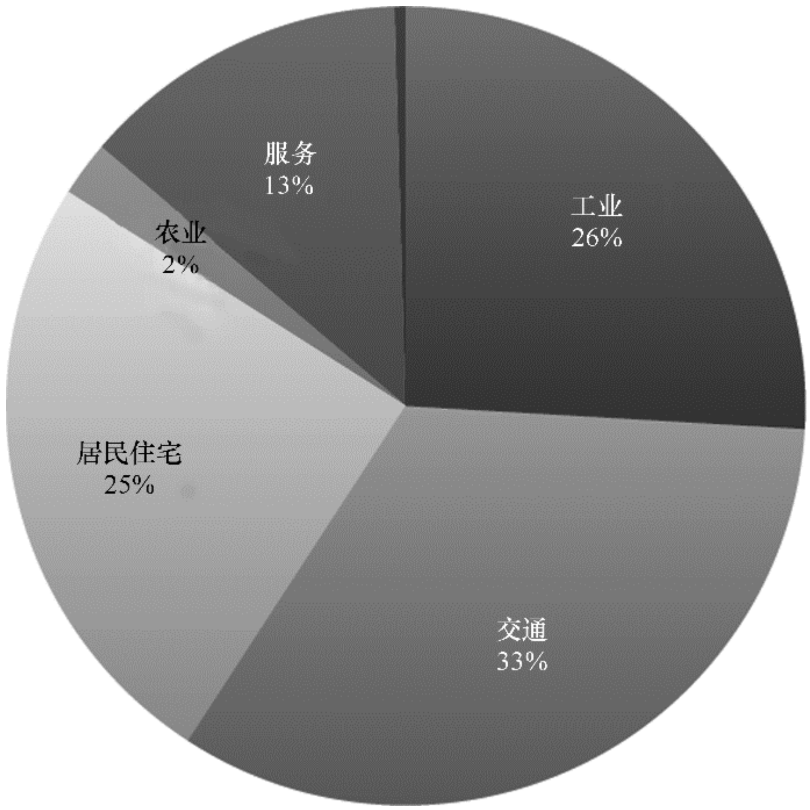
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[illegible]

[illegible]

6.1 [illegible]

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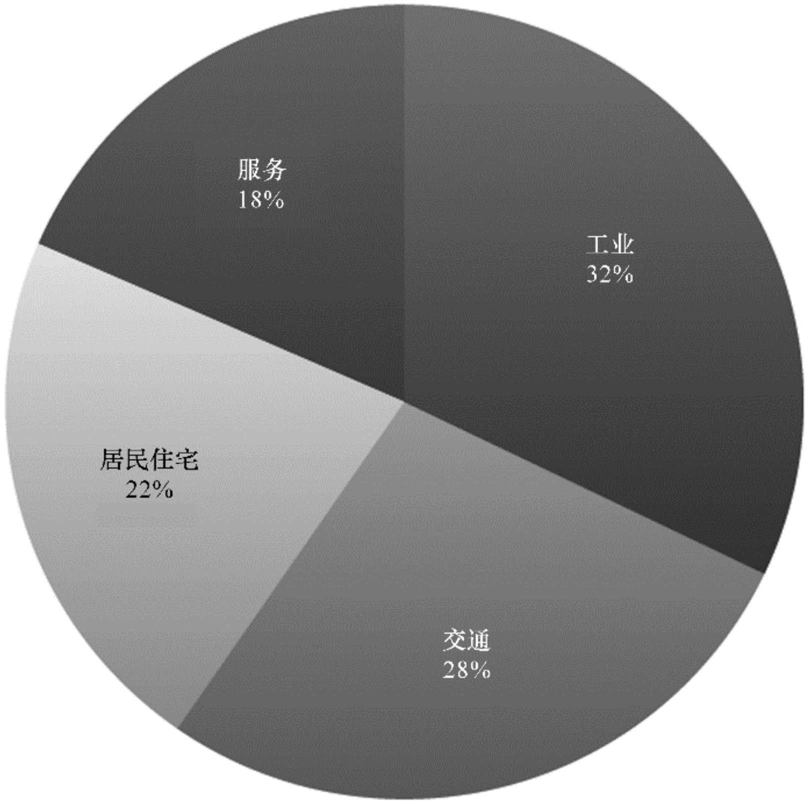
□6.1 2014□□□28□□□□□□□□

□□□□ 20 □□□ 6.3 □□6.4□□

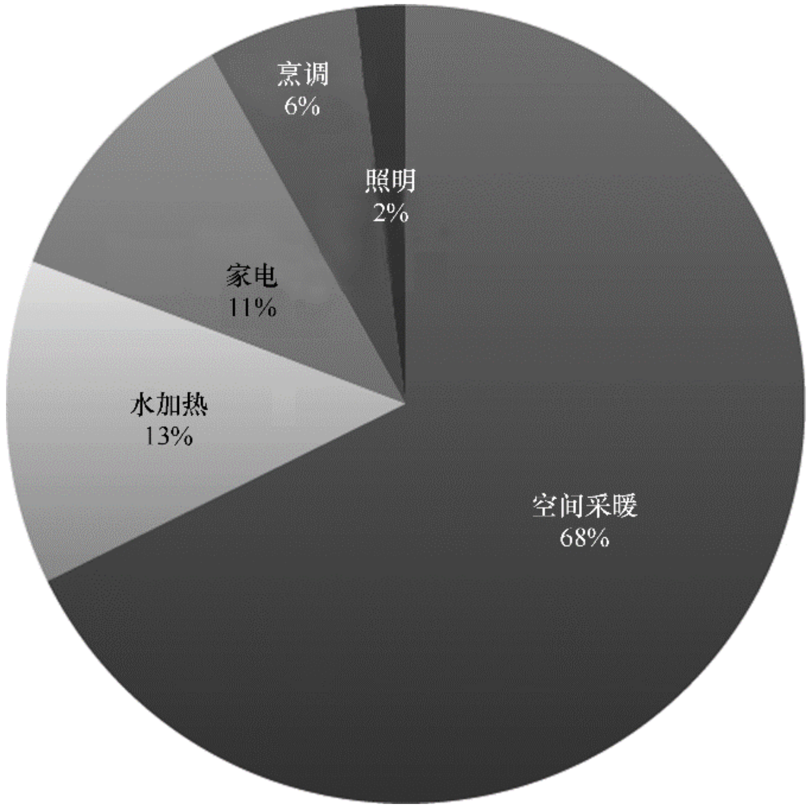
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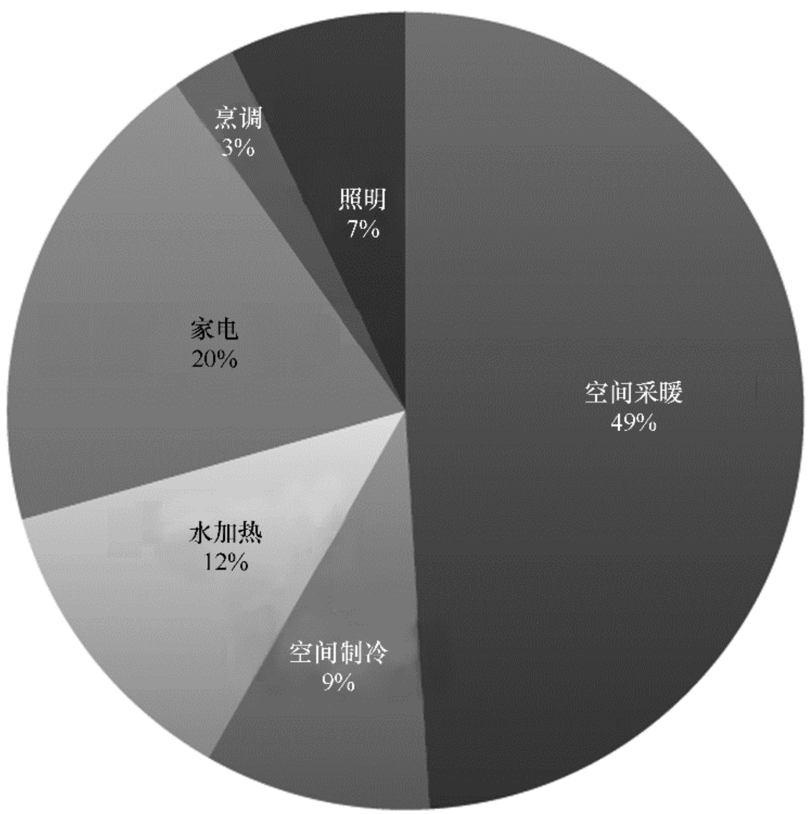
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□6.3 2012□EU-27□□□□□□□



[illegible]6.4 2014[illegible]

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6.1.1 [illegible]

[illegible]30%[illegible]15%[illegible]20%[illegible]EN15232[illegible]“[illegible]—[illegible]”[illegible]EN15232[illegible]BACS[illegible]

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[illegible]4[illegible]A[illegible]D[illegible]A[illegible]D[illegible]

[illegible]BACS[illegible]BACS[illegible]6.2[illegible]4[illegible]BACS[illegible]BACS[illegible]6.1[illegible]C[illegible]A[illegible]B[illegible]

[illegible]6.1 [illegible]BACS[illegible]A[illegible]B[illegible]BACS[illegible]C[illegible]1[illegible]

	[illegible]				[illegible]			
BACS[illegible]	D	C	B	A	D	C	B	A
[illegible]	1.51	1.00	0.80	0.70	1.10	1.00	0.93	0.87
[illegible]	1.24	1.00	0.75	0.50	1.06	1.00	0.94	0.89
[illegible]	1.20	1.00	0.88	0.80	1.07	1.00	0.93	0.86
[illegible]	1.31	1.00	0.91	0.86	1.05	1.00	0.98	0.96
[illegible]	1.31	1.00	0.85	0.68	1.07	1.00	0.95	0.90
[illegible]	1.23	1.00	0.77	0.68	1.04	1.00	0.96	0.92
[illegible]	1.56	1.00	0.73	0.60	1.08	1.00	0.95	0.91
[illegible]	1.10	1.00	0.88	0.81	1.08	1.00	0.93	0.92

[illegible]6.2 BACS[illegible]

[illegible]A	**[illegible]BACS [illegible]**

[illegible]A	[illegible]BACS [illegible]
[illegible]B	[illegible]BACS[illegible]TBM[illegible]
[illegible]C	[illegible]BACS [illegible]
[illegible]D	[illegible]BACS [illegible]

6.1.2 [illegible]

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6.2 [illegible]

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6.3 [illegible]

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[illegible]7[illegible] [illegible]

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7.1 [illegible]

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7.2 [illegible]

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7.3 [illegible]

[illegible]3[illegible]

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7.3.2 [illegible]

[illegible]20kbit/s[illegible]250kbit/s[illegible]60[illegible]20[illegible]3000[illegible]1000[illegible]

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- [illegible]KNX[illegible]LON

[illegible]Z-Wave[illegible]ZigBee[illegible]BLE[illegible]Bluetooth Low Energy[illegible]RFID[illegible]WLAN[illegible]Wi-Fi[illegible]

2016[illegible]Wi-Fi[illegible]802.11ah“HaLow”[illegible]Wi-Fi[illegible]“HaLow”[illegible]900MHz[illegible]Wi-Fi[illegible]2.4GHz[illegible]5GHz[illegible]Wi-Fi[illegible]Wi-Fi[illegible]

[illegible]EnOcean[illegible]7.1[illegible]

□7.1 □□□□□□□□□

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Z-Wave	1999	30m	250kbit/s	908.42MHz	GFSK	IEEE 802.15.4(*)	10m(**)
ZigBee	2003/2006	30m-500m	250kbit/s	2.4GHz □□□□ 902MHz □□□□ 868MHz □□□□	QPSK	ITU-G.9959	10m(**)
WirelessHart	2004	50m/250m	250kbit/s	2.4GHz	DSSS□O-QPSK	IEEE 802.15.4(*), IEC 62591	10m(**)
MiWi	2003	20m/50m	20kbit/s 40kbit/s 250kbit/s	868MHz 915MHz 2.4GHz	O-QPSK	IEEE 802.15.4(*)	10m(**)
EnOcean	2001	30m-300m	125kbit/s	902MHz □□□□□ 868MHz□□□□315MHz	ASK	ISO/IEC 14543-3-10	N/A
DASH7 □active RFID□	2004	-1000m	200kbit/s	433MHz	GFSK	ISO/IEC 18000-7	1m
HaLow	2016	□□1000□	100kbit/s □8Mbit/s	900MHz	BPSK, QPSK, QAM	IEEE 802.11ah	N/A

(*) LR-WPAN□Low Rate Wireless Personal Area Network□□□□□□□□□

(**) □□□□□□□□□□□□□□□□□□□□□□

7.3.3 □□□□□□□

在楼宇自动化领域，最流行的两个总线标准是KNX和LON。KNX是被欧洲电工标准化委员会认可的标准（EN50090：2003），同时也是ISO/IEC14543-3：2006）。KNX是一个由欧洲Konnex协会推出的标准，它结合了EIB（European Installation Bus）、Batibus（法国协会的标准）和EHS（European Home System）三个标准。据估计，75%的欧洲楼宇自动化都会使用这个协议，而且现在大部分KNX的设备都是基于双绞线的。KNX同时也支持电力线、无线电频率和以太网进行连接。

LON（Local Operating Network）是一个由Echelon公司在1990年推出，于2008年被采纳为ISO/IEC 14908的开放标准的网络协议。这个协议主要在北美使用，并且也可以在双绞线、电力线和无线电等介质中运行。与KNX相比，这两个协议的主要区别是其控制智能分布在哪里。传统的集中式控制通常都有一个中央控制单元，而分布式控制系统中每个节点都具有一定的处理能力和控制智能。

7.3.4 楼宇控制系统

一般的楼宇控制系统结构分为3 层：管理层——集中监视和管理的中心；控制层——在现场进行自动化控制的控制器；以及现场层——位于现场的传感器和执行器。管理层通常由中央服务器组成，负责对整个系统进行监视、数据存储和管理；控制层通过现场总线与现场设备通信，执行本地的控制逻辑；现场层则直接与被控对象相连，负责采集数据和执行控制命令。

7.4 服务器

服务器是整个智能家居系统的核心，它负责运行家居管理软件，存储系统的配置信息和历史数据，并且为用户提供访问接口。服务器的硬件可以是专用的嵌入式设备，也可以是一台普通的计算机。在很多家庭中，这个服务器也被称为“家庭网关”。通常情况下，服务器可以是一台Linux/Windows/OS-X PC，但是因为需要长时间不间断地运行，所以应该考虑其功耗、噪声以及对UPS（不间断电源）的支持等问题，以保证系统的稳定。

7.5 网络连接

家庭网络是智能家居系统的基础设施，它将各种设备连接起来，使它们之间能够互相通信。家庭网络可以使用各种不同的技术，包括有线网络和无线网络。有线网络通常使用以太网，具有传输速率高、稳定性好的特点，但是需要布线；无线网络则不需要布线，安装方便，但是可能会受到干扰，而且传输速率和稳定性不如有线网络。在实际应用中，通常会将两者结合使用，例如，使用以太网连接服务器和主要设备，使用WLAN连接移动设备。此外，还需要考虑网络的安全性，防止未经授权的访问，保护用户的隐私和系统的安全。

7.6 用户界面

用户界面是用户与智能家居系统进行交互的窗口，它的好坏直接影响到用户的使用体验。一个好的用户界面应该简单直观、易于操作，能够让用户方便地查看系统状态和控制各种设备。用户界面可以有多种形式，例如，墙面上的触摸屏、遥控器、智能手机和平板电脑上的应用程序，以及PC上的网页等。不同的界面适用于不同的使用场景。

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- [illegible]Web/IP[illegible]
- [illegible]Web/IP[illegible]
- [illegible]/[illegible]/[illegible]

[illegible]

7.7 [illegible]Google[illegible]Apple[illegible]Samsung[illegible]

2014[illegible]3[illegible]Apple[illegible]HomeKit[illegible]Samsung[illegible]SamrtThings[illegible]2[illegible]Google[illegible]32[illegible]Nest Labs[illegible]

7.7.1 Google[illegible]Nest Labs

Nest Labs[illegible]Apple[illegible]Nest Labs[illegible]Nest[illegible]Nest[illegible]Nest[illegible]2014[illegible]Nest[illegible]Dropcam[illegible]Dropcam[illegible]Dropcam[illegible]Nest[illegible]Dropcam[illegible]Nest[illegible]“Away[illegible]”[illegible]

Nest[illegible]Nest Lab[illegible]Thread[illegible]http://www.threadgroup.org[illegible]6LoWPAN[illegible]IEEE 802.15.4 LR-WPAN[illegible]IPv6[illegible]ZigBee[illegible]WirelessHART[illegible]Philips[illegible]Hua[illegible]802.15.4[illegible]Thread[illegible]

7.7.2 [illegible]……Apple HomeKit

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- HAP□HomeKit Accessory Protocol□Homekit□□□□□
- HomeKit□□□API

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□□□□□HomeKit API□□□□□□□□□□iOS□□□□□□□HomeKit□□□□□□□□□□□□□□□
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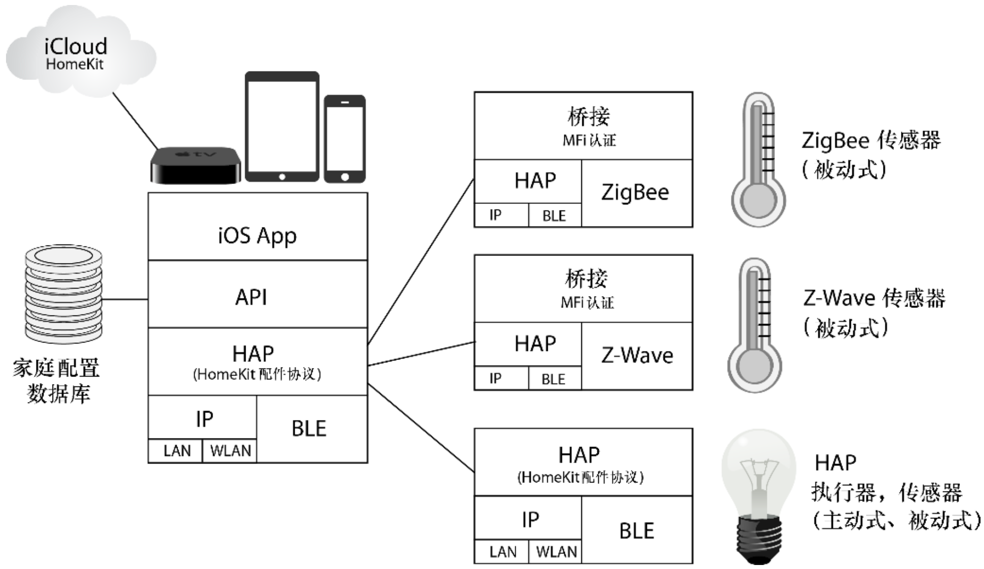
□HomeKit□□□□□□□□□□□□□□□HomeKit□□□□□HomeKit Bridges□□□□□□□□
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□7.1 Apple□□□□□□HomeKit

7.7.3 Samsung□SmartThings

2014 □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□SamrtThings □http://www.smartthings.com□□□□□□□□□□□□□□□□Samsung□SmartThings□□□□□□□□□□□□□□□□□□□□□□iOS□Android□□□□□ SmartThing Hub□□□□□□□□Z-Wave□ZigBee□□□□□□□□□□SmartThings Hub□□□

7.8 □□□□□□□□□□□□□□

□□WLAN□Wi-Fi□□WLAN□□□□□□□□□□□□□□□□□General Electric□□□□□□□□□□□Wi-Fi□□□□□□ □http://www.geappliances.com/ connected-home-smart-appliances/□□Samsung□SmartTV□□□□□□□Denon□Marantz□□HVAC□Heating□Ventilation and Air Conditioning□□□□□□□□□□□□□□□Nest□Apple□□□OpenRemote□

[illegible]2.4GHz[illegible]900MHz[illegible]“[illegible]”[illegible]

[illegible]Nest Lab[illegible]Google[illegible]InfoWorld[illegible]

[illegible]Wi-Fi[illegible]WLAN[illegible]BLE[illegible]EnOcean[illegible]Apple[illegible]HomeKit[illegible]Nest[illegible]Thread[illegible]7.2[illegible]

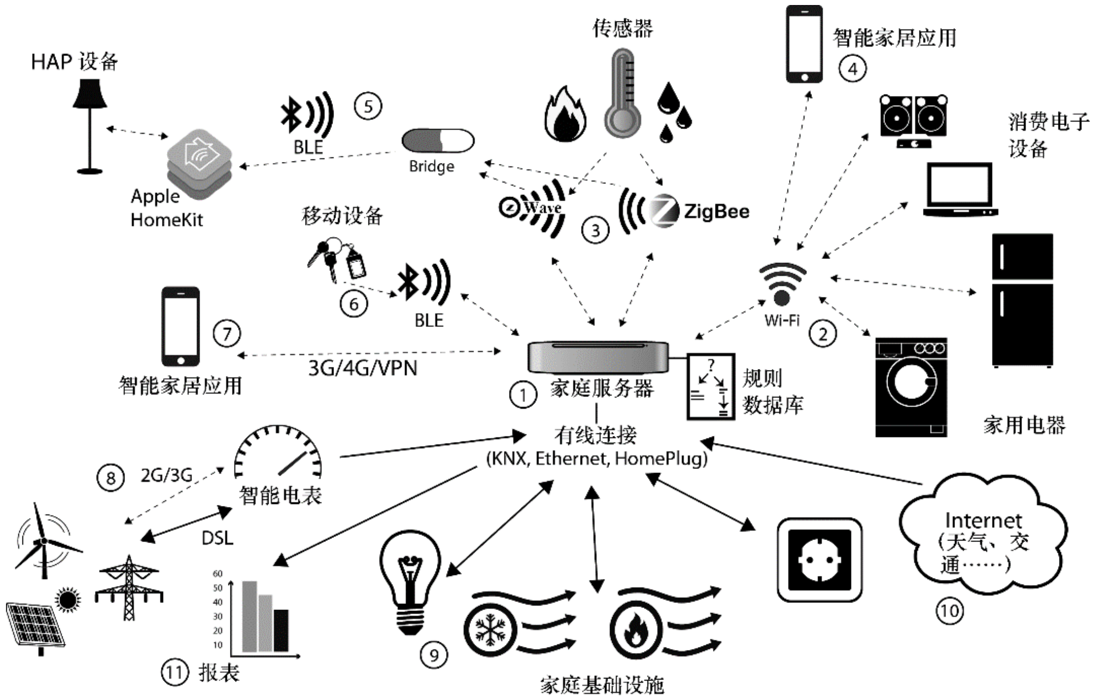
7.9 [illegible]

[illegible]“[illegible]”[illegible]

[illegible]1[illegible]7[illegible]24[illegible]

[illegible]2[illegible]Wi-Fi[illegible]WLAN[illegible]

[illegible]3[illegible]Z-Wave[illegible]ZigBee[illegible]



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8.1 OpenRemote□□

OpenRemote□□□3□□□□□□

- OpenRemote Controller□□□□□□□□24/7□□Linux□Windows□□OS X□□OpenRemote Controller□□□□□□□□□□□“□□”□□□□□□□□□□□□□□□□□□Drools□□□□□□□□□□□
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- OpenRemote Designer□□□□□□□□□□□□□□□□□□□□□□□GUI□□OpenRemote Designer□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[illegible]OpenRemote Designer[illegible]

OpenRemote[illegible]API[illegible]2[illegible]8.1[illegible]

[illegible]8.1 OpenRemote[illegible]

KNX	**[illegible] http://www.knx.org**
TCP/IP[illegible]UDP[illegible]Telnet[illegible] HTTP	[illegible]
Insteon	[illegible]RF[illegible] http://www.smartlabsinc.com
Shell[illegible]	Shell[illegible]
DataTime[illegible]	[illegible]/[illegible]
EnOcean	[illegible]ISO/IEC 14543-3-10[illegible] http://www.encoean.com
Russound RNET[illegible]	[illegible]Russound[illegible]/[illegible]
DSC IT-100	DSC[illegible]
HSC Z-WAVE IP [illegible]	Honeywell Z-Wave[illegible]
Z-Wave	[illegible] http://www.z-wavealliance.org

KNX	**□□□□□□□□□□□□□□□□ http://www.knx.org**
AMX□□□	AMX□□□□□□□□□□
1-Wire□□	□□Maxim Integrated□□□□□□□□□□ http://www.maxinintegrated.com
ISY-99	□□□□□□□□□□□□□□□□□□□□
panStamp lagarto	□□PanStamp□□□□□□□□□ Hrrp://www.panstamp.com
Wake-On-Lan□□	□□□□□□□□□□□□□□□□
Lutron HomeWorks	□□Lutron□□□□□□□□□□□
Domintell	□□Domintell□□□□□□□□□□□
Denon□□AVR□□	□□□□Denon/Marantz□□/□□/□□□□□
Samsung□□□□□□	□□□□Samsung□□□□□□□
X10	□□□□□□□□□□□□□□□□□□
GlobalCache	□GlobalCache□□□□□□□□□□□
XBMC	□□□□□□□□□ http://xbmx.org
xPL□IRTrans□VLC□ FreeBox□MythTV	□□□□□□□□□□□□□□□□

KNX	**□□□□□□□□□□□□□□□□ http://www.knx.org**
Philips Hue	□□Philips□□□□□□□

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8.2 OpenRemote Controller□□

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- □□□OpenRemote□□□□OpenRemote□□□□

http://www.openremote.org/signup.action

- □□OpenRemote Designer□□□□□□OpenRemote Designer □□□

http://composer.openremote.org/demo/login.jsp

□□□□□□□□□□□□□OpenRemote Controller□□□

http://www.openremote.org/display/HOME/Download

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```
shProject/ORC/bin/openremote.sh□OS X□□□□□
shProject/ORC/bin/openremote.bat□Windows□□□□□
```

□□□□□□□□□□shProject□□□□□□□□□OpenRemote□□□□□□□□□□□□□□□□□

8.3 □Mac OS X□□□□

□□□Mac□□□□□□□□□□OS X□□□□□□□□Application-Utilities□□□□□□□□□
□□□□□□□□□□□□□□□□□□□□□□□□□□□

`ls -l`	□□-l□l□□long□□□□□□□□□□□□□□□□□□□□□□□□□□□□
`ls –a`	□□-a□□ □.bash□□□□□
`pwd`	□□□□□□□—□□□□□□□□□□
`cd ..`	□□□□□□□□□□□□□□□□□□□□□—□□□□□□□□□□□□□□□□□□□
`cd`	□□□□cd□□□□□□□□□□□□□
`cd /target`	| □□□□□□□□□
`mkdir name`	□□□□□□□□□
`man mdc`	□□□□□□□□□□□□

8.3.1 Java□□□□□□

□□OpenRemote□□□Java□□□□□□□□□□□□□□□□□□□□□□□□□Java
Runtime Environment□JRE□Java□□□□□□□□□□□□□□□□□

```
java -version
```

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Java Runtime Environment□□□□□□□Oracle□□□□□□□□□□□□□□□□□□□
□□□□□□□□□JRE□□□□□□□□□□□□□□□□□□Mac□□□□□□□□□□□□□□□Drools
□□□□□□□5.1.1□□□□□□□□□OpenRemote□□□□□□□□□□□□1.6□□□Java□
□□□□□□□□□□□□□Apple□□□□□□□Java 1.6□□□□□□□□Apple□□□□□□□□□

http://support.apple.com/kb/DL1572

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```
java -version
java version "1.6.0_25"
Java(TM) SE Runtime Environment (build 1.6.0_25-b17)
```

8.3.2 □□$JAVA_HOME□□

□□□OpenRemote Controller□□□□□□□□□□□□□□□□□□$JAVA_HOME□□□$JAVA_HOME□□Java□□□□□□Java□□□□□□□□□□Java□□□□□□□

□OS X□Linux□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□$PATH□□□□□□□□□□□□□$PATH□□□□□□□□□□□□□□□□□□□□□□□□□□□□$PATH□□□□OS X□□□□□□$PATH□□□□□□□□□□.bash_profile□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ls –a□□□□□□□□□□□□□□□□□□□□□□□□□

```
touch ~/.bash_profile
open ~/.bash_profile
```

touch□□□□□□□□□□□□□□□□□□open□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Mac□□□TextEdit□□□□□□□□□□□□$JAVA_HOME □□□□□□□□□ Java Runtime Environment□□□□

```
export     JAVA_HOME=/System/Library/Frameworks/JavaVM.
framework/Versions/1.6.0/Home
```

□□□□□□□□$PATH□□shProject□□□OpenRemote□□□□□ORC/bin□□□□□□□□□□□□

```
export PATH="$HOME/shProject:$HOME/shProject/ORC/bin:$PATH"
```

$HOME□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□echo $HOME□□□□□□□□□□□□□.bash_profile□□□□□$HOME□□□$PATH□□□□□□□□□□$PATH□□□□□□□□□□□□□□□□□TexiEdit□□□.bash_profile□□□□□□□□□□□□□□□□□□□□□□□□□$PATH□□□□□□□□□□echo $PATH□echo $JAVA_HOME□□□□□□□□□□□□□□□□□□□□□$PATH□□□□□□□□□□□□□□□□$JAVA_HOME□□□□□

```
echo $PATH
/Users/smarthome/shProject:/Users/smarthome/shProject/
ORC:/usr/bin:/bin:/usr/sbin:/sbin:/usr/local/bin:/opt/
X11/bin
echo $JAVA_HOME
/System/Library/Frameworks/JavaVM.framework/Ver-
sions/1.6.0/Home
```

8.3.3 □Mac□□$JAVA_HOME□□□□□OS X□□

□□□□Mac□□□□□□□□□□□□□□□□□□□□□□□□□Java□□□□OS X10.8□□□Java□□□MAC□□□□□□□□□□□□□□□□□OS X 10.8□□□□Java□□Mavericks□OS X 10.9□□Yosemite□OS X 10.10□□□□□□□□□□□□□□□□□□□□□□□□□□□Java □□□□□□□□□□JRE□JDK□□□□□□□□□□□□□□java.com□□□□□□□□□□□□Java□□□□□□□http://support.apple.com/kv/DL1572□□□Apple□□□Java□□□□□□□□□□□□Java□□.bash_profile□□□□□$PATH□□□□□□□□□□□$JAVA_HOME□□□□□□□□□□□Mac□□□□□□□□□□□□java_home□□□□□□□□□□$JAVA_HOME□□□□□□□□□□□□□□Java□□□□□□□

8.3.4 Mac□□$JAVA_HOME□java_home□□

□□□□□□□□□□□□$JAVA_HOME□□□□□□□□□□Apple□□□java_home□□□□□□□□□□□□□□$JAVA_HOME□□□□□□□□□□□□□□□□□/usr/libexec/□□□□□□□.bash_profile□□□□□□□

```
echo $PATH
export PATH="$HOME/shProject:$HOME/shProject/ORC/
bin:$HOME/shProject/ORC/webapps/controller/rules:$PATH"
export JAVA_HOME=$(/usr/libexec/java_home)
```

8.3.5 □□openremote.sh

OpenRemote Controller□□□□□□openremote.sh□□/shProject/ORC/bin□□□□□□□□ORC/bin□□□□□□□□□□□□□□ls -l□□OS X□Linux□□□□□□□□□□3□□□□□□□□□□□□□□□□□□□□□3□□□□□□□□□□□□□□□□□□□□

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```
ls -l ./shProject/ORC/bin
total 48
-rw-r--r--@ 9854 10 Mar 2012 openremote.bat
-rw-r--r--@ 12039 10 Mar 2012 openremote.sh
```

□□□□□□□□openremote.sh□□□□□□□□□chmod +x□□□□□□□□□□□□□□

```
chmod +x ./shProject/ORC/bin/openremote.sh
```

□□□□□□□□□□□□□□OpenRemote:

```
./openremote.sh run
```

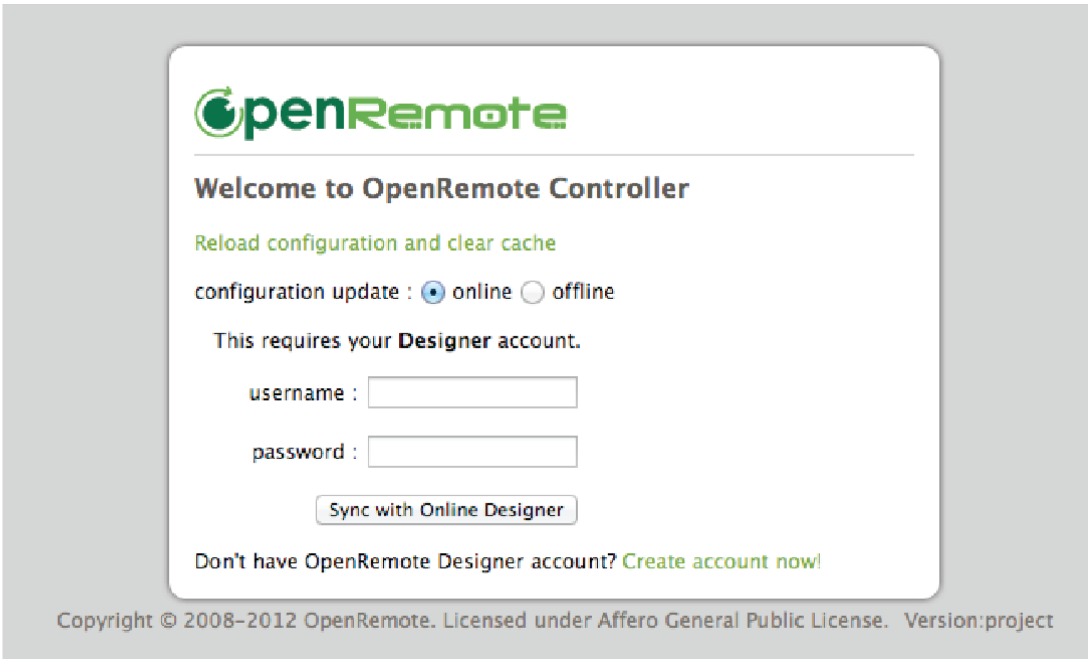
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
INFO: Server startup in 3159 ms
```

□□□OpenRemote Controller□□□□□□□□□□□□□□□□□□□□□URL□□Web□□□□□□□□□□□

http://localhost:8080/controller

□□□□□□□8.1□□OpenRemote Online Designer□



□8.1 OpenRemote Controller□□□□

8.3.6 □□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□shProject□□□□□□□□□□□□□OpenRemote□□□□□□□□□□□□□□□ORC□□OpenRemote□□□□□□

8.4 □Windows 7□8□XP□□□□

□Windows□XP/7/8□□□□□□□□□□□□□□□Java Development Kit□JDK□Java□□□□□□□□□□□□□□□□□□□□□□□□□□□Start-Control-Panel-Add or Remove Programs□□□-□□□□-□□□□□□□□□□□□□□□□□□□Java□□□□□□□□JRE□□□□□JDK□□□□□□□

http://www.oracle.com/technetwork/java/index.html□□□□□
Windows□□□□□□□Java Development Kit□

□□Drool□□□□□□5.1.1□□□OpenRemote□□□□□□□□□□□□□6.x□JDK
□□□□□□□□□□□□□□2015□□□□□□□□□OpenRemote□□□□□□□JDK
6.x□□□JDK 6.4.5□□□□□□□□□□□□□□OpenRemote□□□□□□□□□□□□
□□□□□□□□Drools□Java 1.6□□□□□□□□□□□□Oracle□Java□□□□□□□
6.x JDK□□
□http://www.oracle.com/technetwork/java/javase/downloads/java-archive-download- javase6-419409.html□□

OpenRemote□□□□Windows 7□Windows 8□□Java Execution
Environment□JRE□Java□□□□□□□□□□□□□Windows XP□□□□JRE□□
□□□□□□□□□□□□□□□□□Java□□□□□□□□□□□□□□□□□□□

```
C:\Program Files\Java\jdk1.7.0_09\
```

□□□□□□□□□□□□□□□□Windows□□□□□□Control Panel□□□□□□□□□
System□□□□□□Advanced□□□□□□□□□□□Environment
Variables□□□□□□□□□□□□□□□□□□□□□□□JAVA_HOME□□□□□□□□□□
□□Java□□
□□□□□□□□□□set□□□Start - Run□□□□□CMD□□□□□□□□□□□□□□□□
□□

```
set
JAVA_HOME=C:\Program Files\Java\jdk1.7.0_09
```

□□□□□□OpenRemote Controller□□□□□□□□□□□□□□□□□□□□□□□□
shProject□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
OpenRemote□□□□□□□□□□□□□OpenRemote-Controller-2.0.1□□
□□□□□□□□□□ORC□□□□□□OpenRemote□□□□□□□□□□□□shProject
□□□□□□□□□□□□□□□□□□□□

```
shProject/ORC/bin/openremote.bat
```

□□□□□□□□□□□□□□□□□□□□OpenRemote□bin□□□□□□□

```
openremote.bat run
```

[illegible]

```
INFO: Server startup in 3159 ms
```

[illegible]OpenRemote Controller[illegible]URL[illegible]Web[illegible]

http://localhost:8080/controller

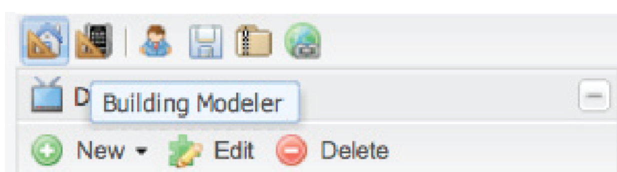
OpenRemote Controller[illegible]8.1[illegible]OpenRemote Online Designer[illegible]

8.5 OpenRemote

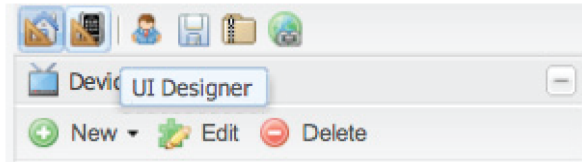
[illegible]OpenRemote Designer[illegible]OpenRemote Designer[illegible]

http://composer.openremote.org/demo/login.jsp

OpenRemote Designer[illegible]GUI[illegible]Building Modeler[illegible]UI Designer[illegible]Building Modeler[illegible]8.2[illegible]UI Designer[illegible]Building Modeler[illegible]8.3[illegible]



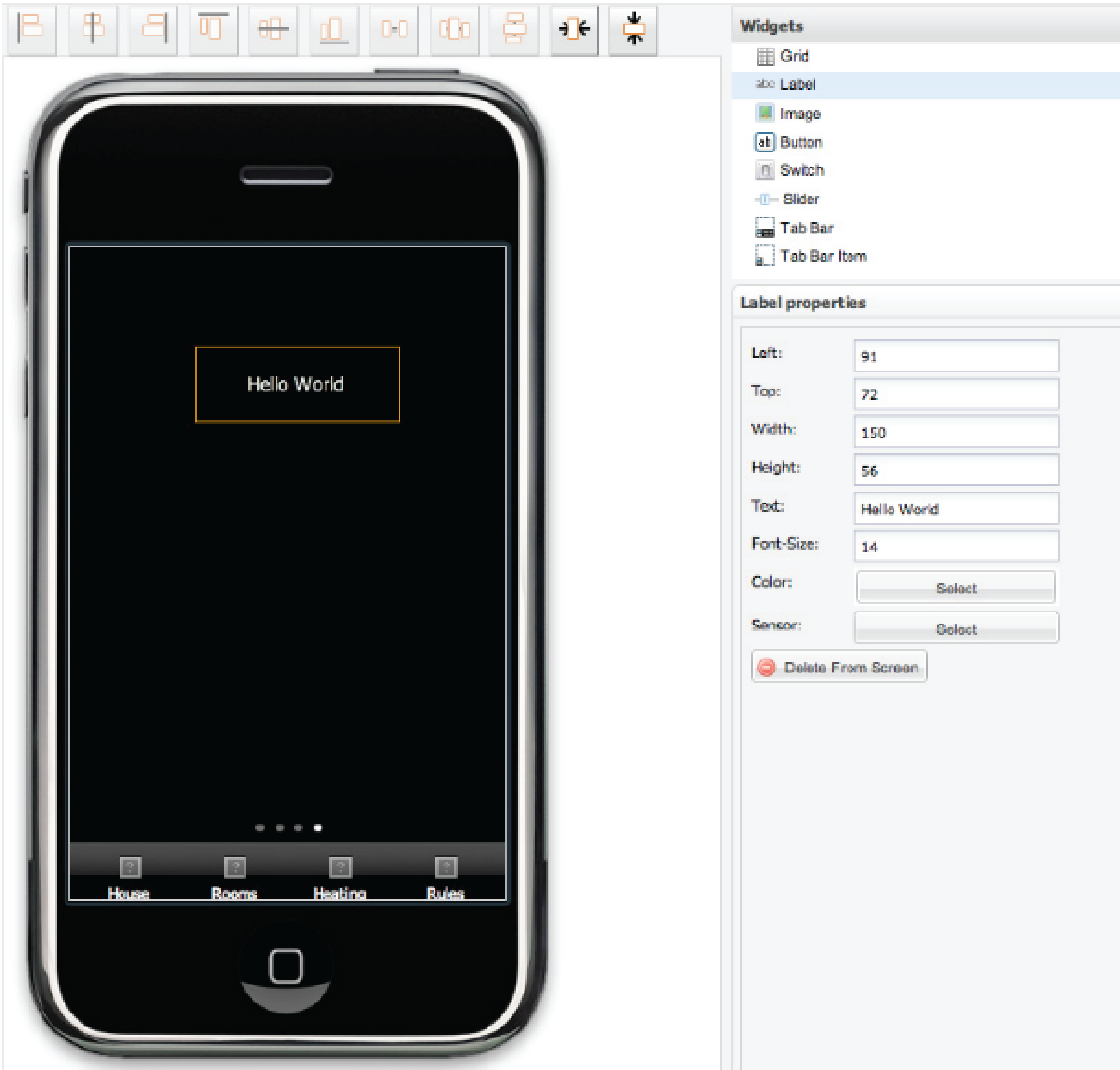
[illegible]8.2 [illegible]OpenRemote Designer[illegible]Building Modeler[illegible]



□8.3 □OpenRemote□□□UI Designer□□

8.6 “Hello World”□□

□□□□OpenRemote Designer□□□□□□□□□□□□□□□□□□□□□□□□□□□“Hello World”□□UI Designer□□□□□□□New – New Panel□□□□□□□□□□□Android□iPhone□iPad□□□□□□□□□□□□□□smart home□□□□□□□□□□□□□□□□□□□□□□



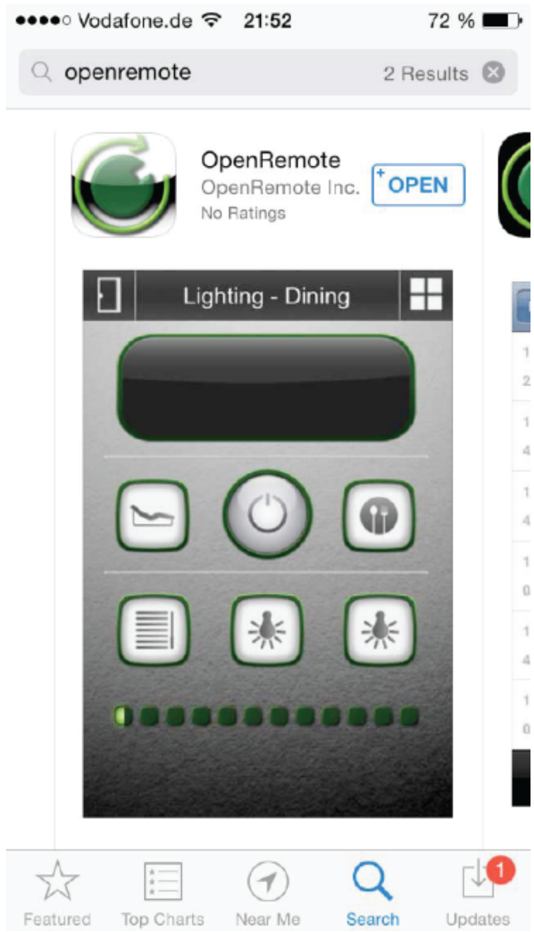
□8.4 OpenRemote Designer□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□OpenRemote Panel□□□□□□□□□□□□□□□□□□□□□□□□OpenRemote□□□□□□□□□□□□□□□□□□□□□□□□“Universal version of the OpenRemote 2 console”□□□□□8.5□□□IP□□□

□□□□OS X8□Mountain Lion□□□PC□IP□□□□□□□Application – Utility – Network Utility□□□□□□□□□OS X 10.9□Mavericks□□□□□□□□□□□/System/Library/CoreServices/Applications/□□□□□□□□□□□□□□Go – Go to Folder...□□□/System/Library/CoreServices/Applications/□□□Network Utility□□□□□□□□Mac□□□□□Spotlight□□□Network Utility□

□Windows□XP/7/8□□□□□□□□□□□□□□□□

```
ipconfig /all
```

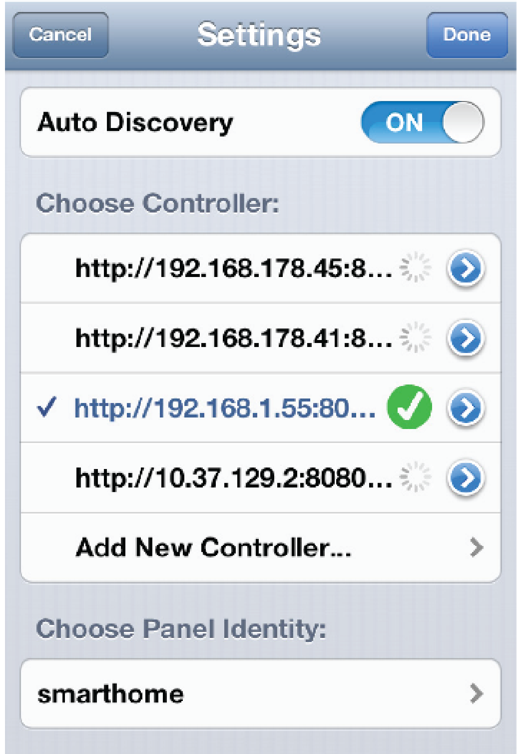


□8.5 □iPhone□□OpenRemote□□□

□□□OpenRemot Panel□□□□□□□□□□□□□□IP□□□□□□□ 8080/controller□□□

```
http://192.168.178.41:8080/controller
```

□□□□□□□OpenRemote□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□8.6□□

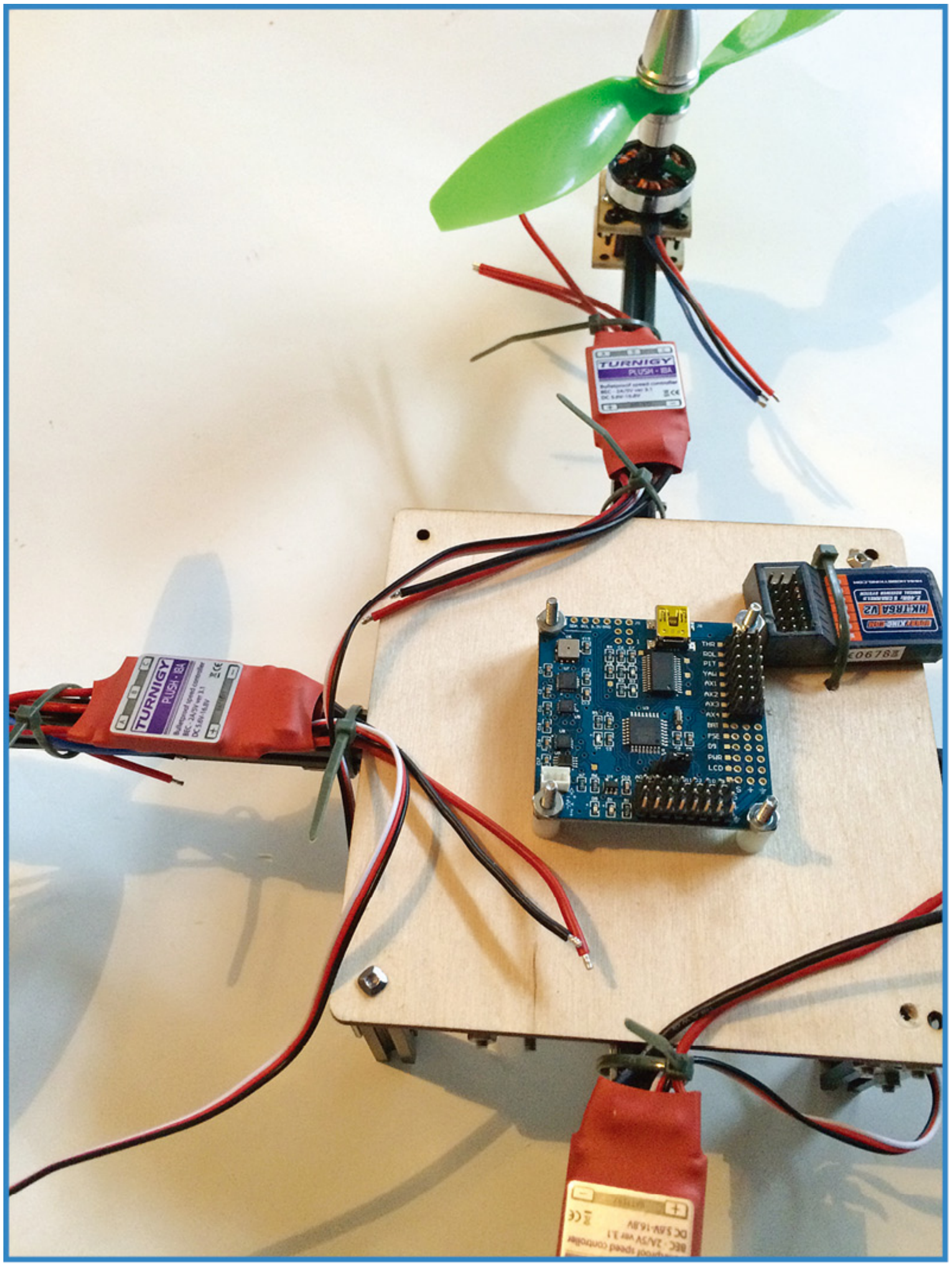


□8.6 OpenRemote□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□panel identity□□□□□□□□□□□□□□□□smarthome□□8.6□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□OpenRemote Designer□□□□□□□□□□□□□□□□□□□□□□□□□□OpenRemote□□□“Hello World”□□□□□□□□□□□□□□□□□OpenRemote Designer□□□□□□□□□□□□□□OpenRemote□□□□□□□□□□□□□conroller.xml not found□□panel.xml not found□□□□□□□□□□□□□□□□□OpenRemote Online Designer□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□“Hello World”□OpenRemote□□□□□□□□□□□□□□□□□□□OpenRemote Designer□□□□□□□□□□□□http://localhost:8080/controller□□□Sync with Online Designer□□□□□□□□□□□□□□OpenRemote Designer□□□□□□□□□□□□□□□□□□□□□□□panel.xml□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□“Hello World”□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[illegible]9[illegible] [illegible]I[illegible]

[illegible]9.1[illegible]—[illegible]—[illegible]



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9.1 [illegible]

[illegible]—[illegible]2[illegible]

[illegible]

[illegible]9.2[illegible]Parallax[illegible]ELEV-8[illegible]



[illegible]9.2 Parallax ELEV-8[illegible]

[illegible]

9.1.1 [illegible]

[illegible]

- [illegible]—[illegible]
- [illegible]—[illegible]4[illegible]
- [illegible]—[illegible]Parallax ELEV-8[illegible]2[illegible]60.96[illegible]—[illegible]
- [illegible]—[illegible]—[illegible]—[illegible]
- [illegible]—[illegible]
- [illegible]—[illegible]
- [illegible]—[illegible]—[illegible]
- [illegible]—[illegible]

9.1.2 [illegible]

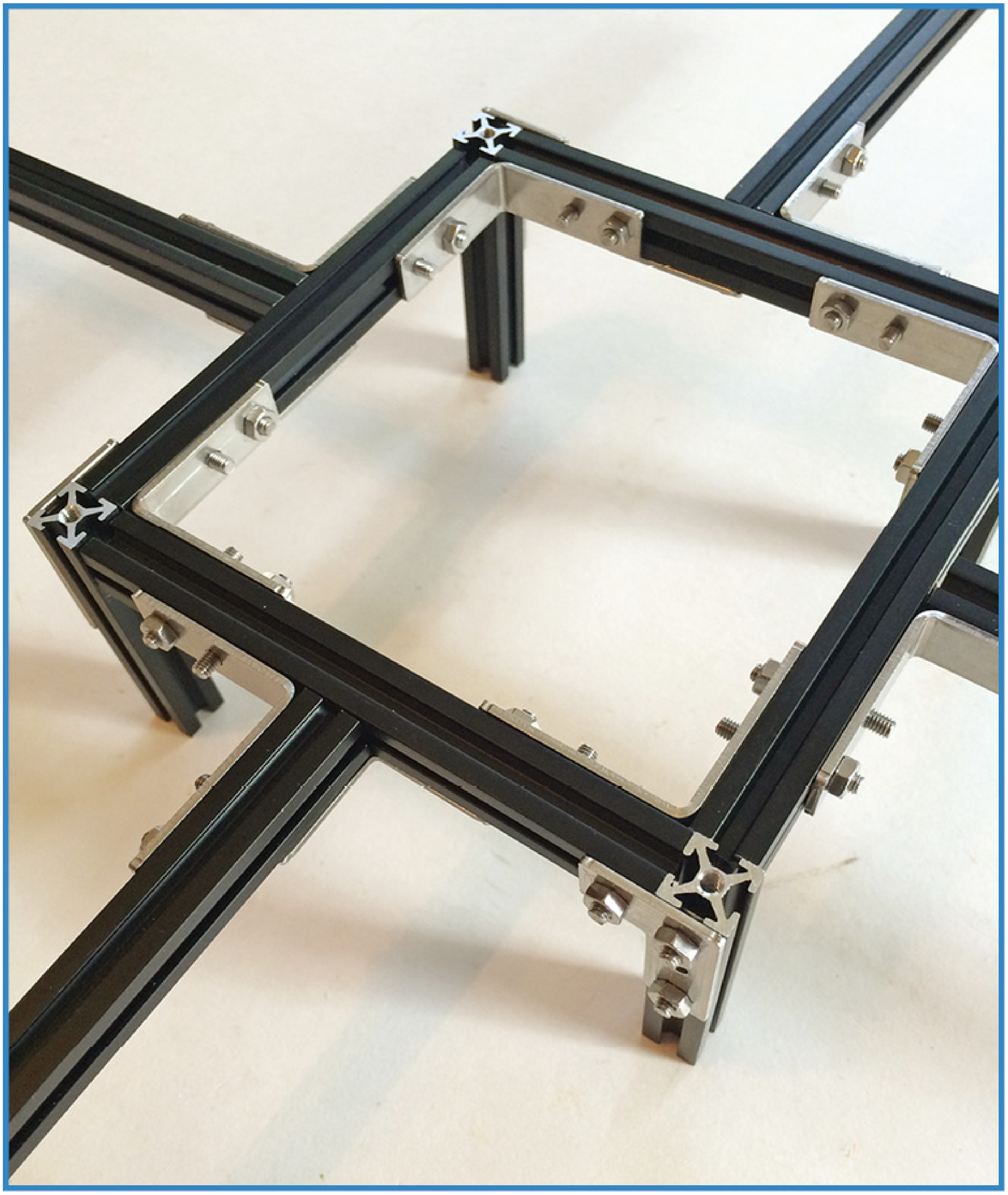
[illegible]

[illegible]3[illegible]

[illegible]

[illegible]DIY[illegible]
[illegible]—[illegible]—[illegible]

[illegible]MakerBeam[illegible]9.3[illegible]



[illegible]9.3 [illegible]

3D[illegible]

□□□□□□□3D□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Thingiverse□□□□
□□□□□□3D□□□□□□□□□□□□□□□□□□□□□□□□□□□□9.4□□T-6□□□□□□□□
□□□Brendan22□□□□□□□□□□□□□□□□□□
http://www.thingiverse.com/Brendan22/designs□□□□□□□

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□tinkercad.com□□3D□□□□□□□□□□□□□□□□□□□□3D□□□□□□□□□□□□
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□□□□



□9.4 T-6□□□□□□□3D□□□□□□6□□□□□□□□□Brendan22□

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□□9.5□□□□□
□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Flone
□http://www.thingiverse.com/thing:113497□□□□□□□□□□□□□□□
—□□□□□□□□□□□□

[illegible]—[illegible]

9.2 [illegible]1[illegible]MakerBeam[illegible]

[illegible]9.6[illegible]



[illegible]9.5 Flone[illegible]Lot Amoros[illegible]



□9.6 MakerBeam□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

9.2.1 MakerBeam

MakerBeam□www.makerbeam.eu□□□□□□□□□M2.5□□□□□□□□□□
□□□□□□□□□□—□□
□□□□□9.7□□



□9.7 MakerBeam□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□2012□□□□□□□□□□□OpenBeam□□□10□□□□□□□□□□□□
□□□

MakerBeam□□□
□□□□□□□□□□□□Amazon.com□□MakerBeam□□□ASIN□
B00G3J6GDM□□

□□□□Adafruit□□□□□OpenBeam□www.openbeamusa.com□□□□□
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□□3D□□□□□□

9.2.2 □□

□□□□□□□□□□□□□□9.8□□□□□□□MakerBeam□□□□□□MakerBeam
Starter Kit□□□□P/N 01MBTBKITREG□□

A. **4□150□□□□□**P/N 100089□□

B. **4□100□□□□□**P/N 100078□□

C. **4□60□□□□□**P/N 100067□□

D. **8□□□□**P/N 100315□□

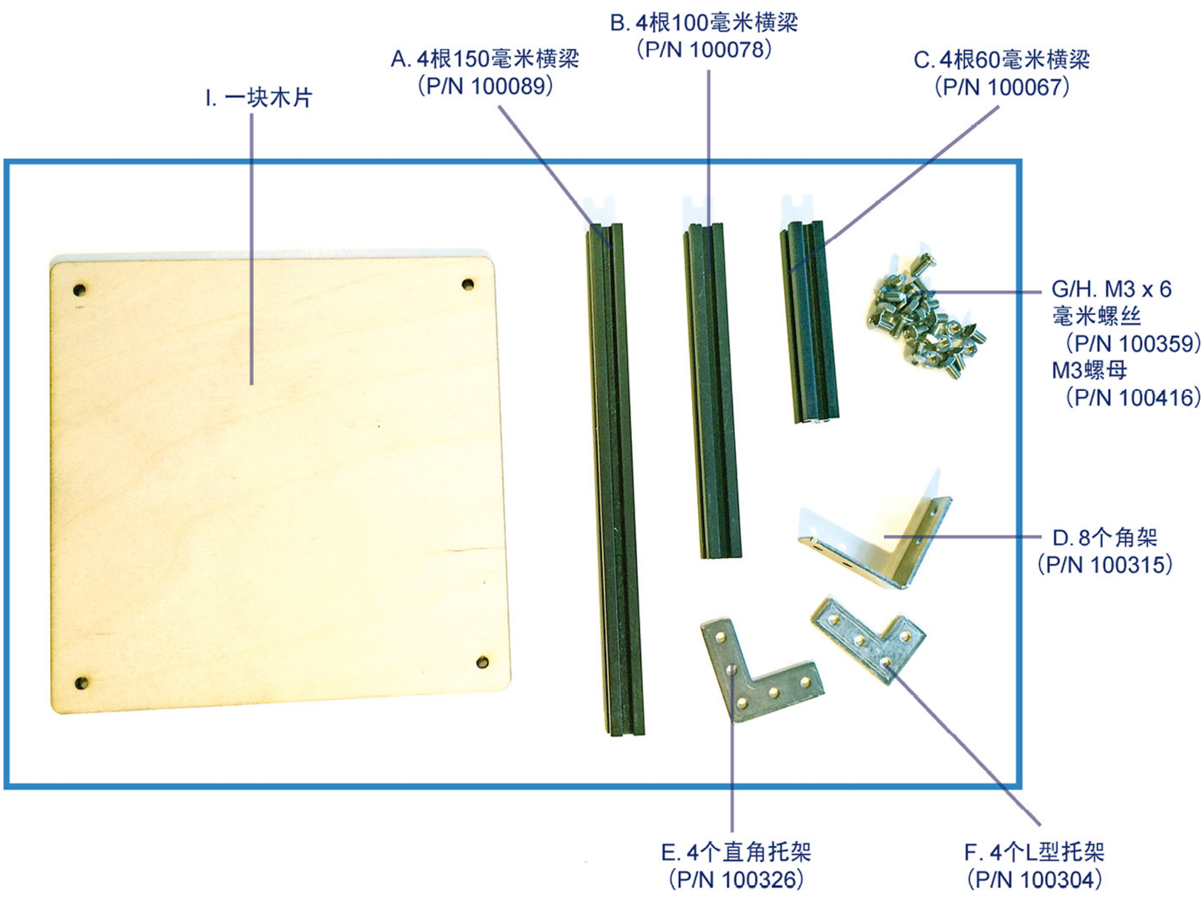
E. **4□□□□□□**P/N 100326□□

F. **4□L□□□□**P/N 100304□□

G. **M3 x 6□□□□□**P/N 100359□□□□□□□□□□□□□□□□□□□Startet Kit □□

H. **M3□□□**P/N 100416□□□□□□□□□□□□P/N 100405□□

I. □□□□□□□□13×13□□□3□□□□1/8□□□□□□□□□□□□□□□□□□□□□□11□□□



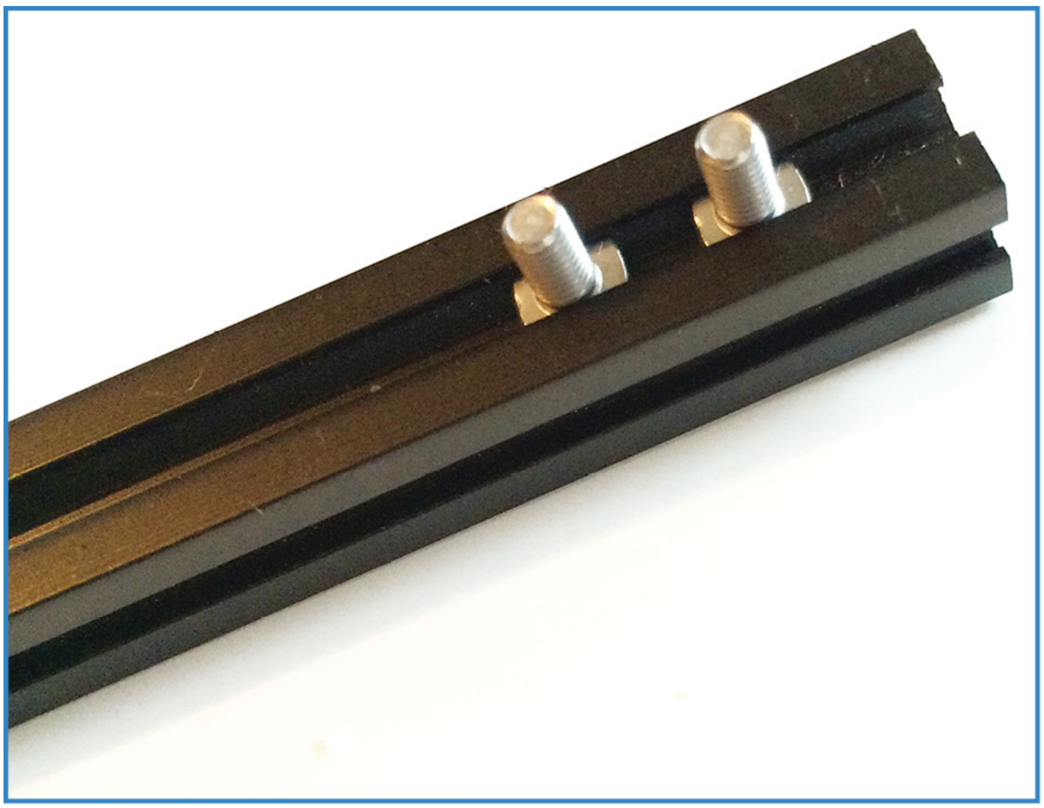
□9.8 □□MakerBeam□□□□□□□

9.2.3 □□

□□□□□□□□□□□□□□□□□□□□

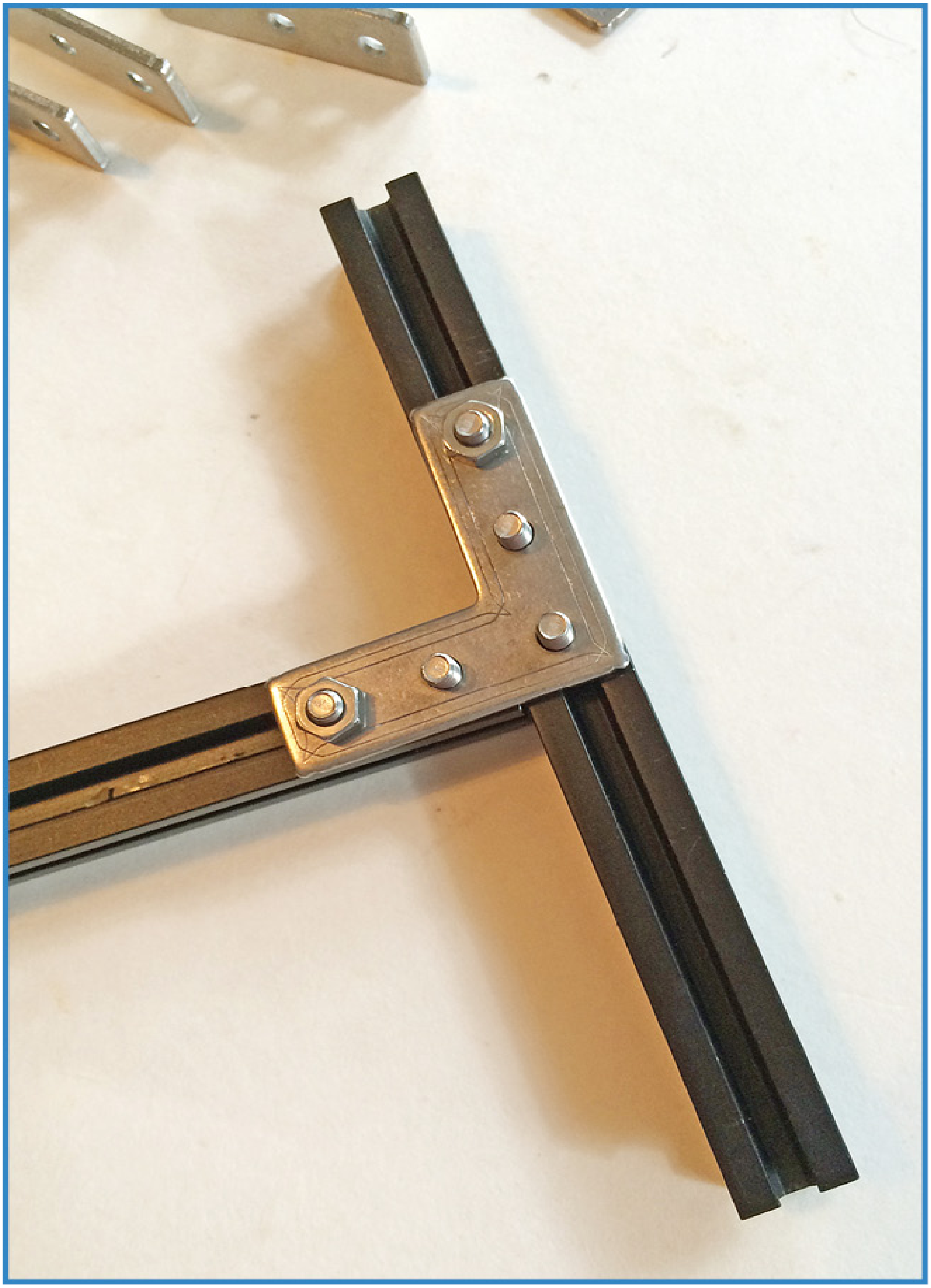
1. □□4□□

a. □□□□□□□150□□□



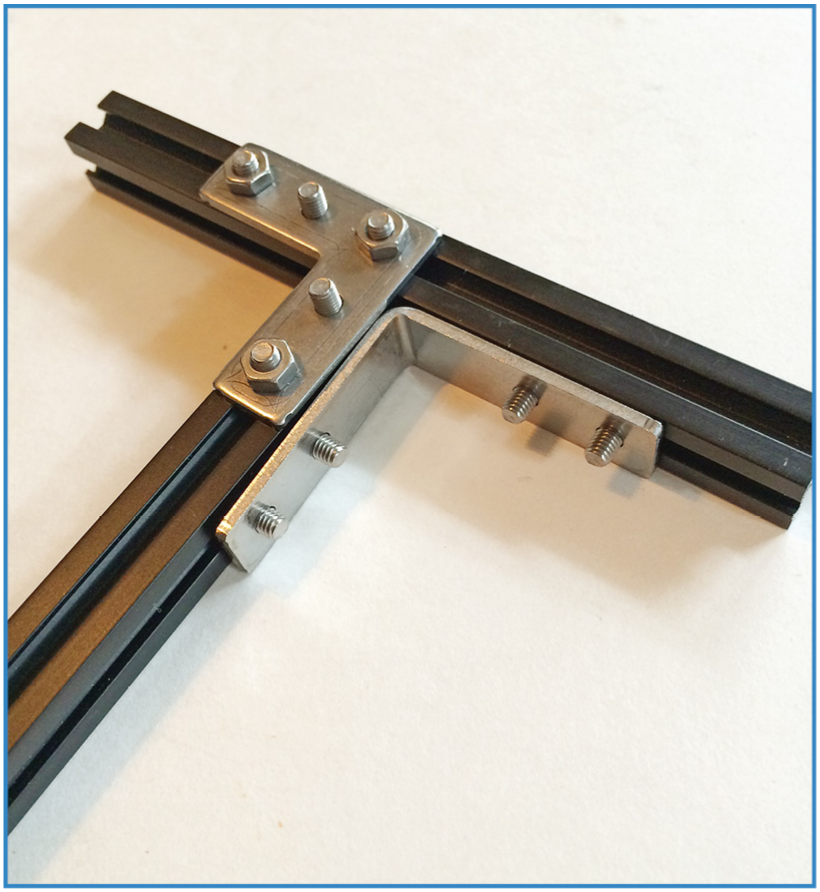
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b. □□□□□□□100□□□□□□□□□□□□□□150□□□□□□□□□□□□□□□□□9.10□□□□□□□□□□□



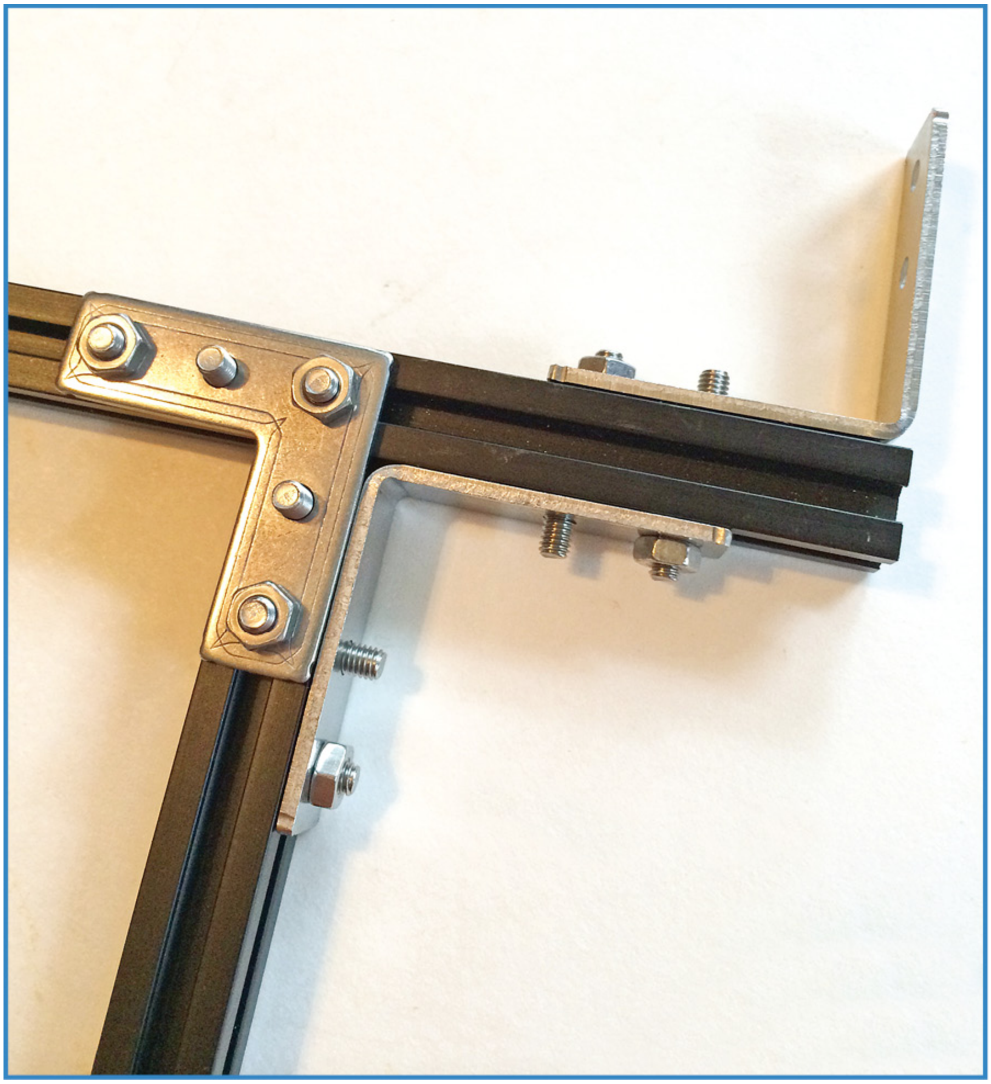
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c. [illegible]9.11[illegible]



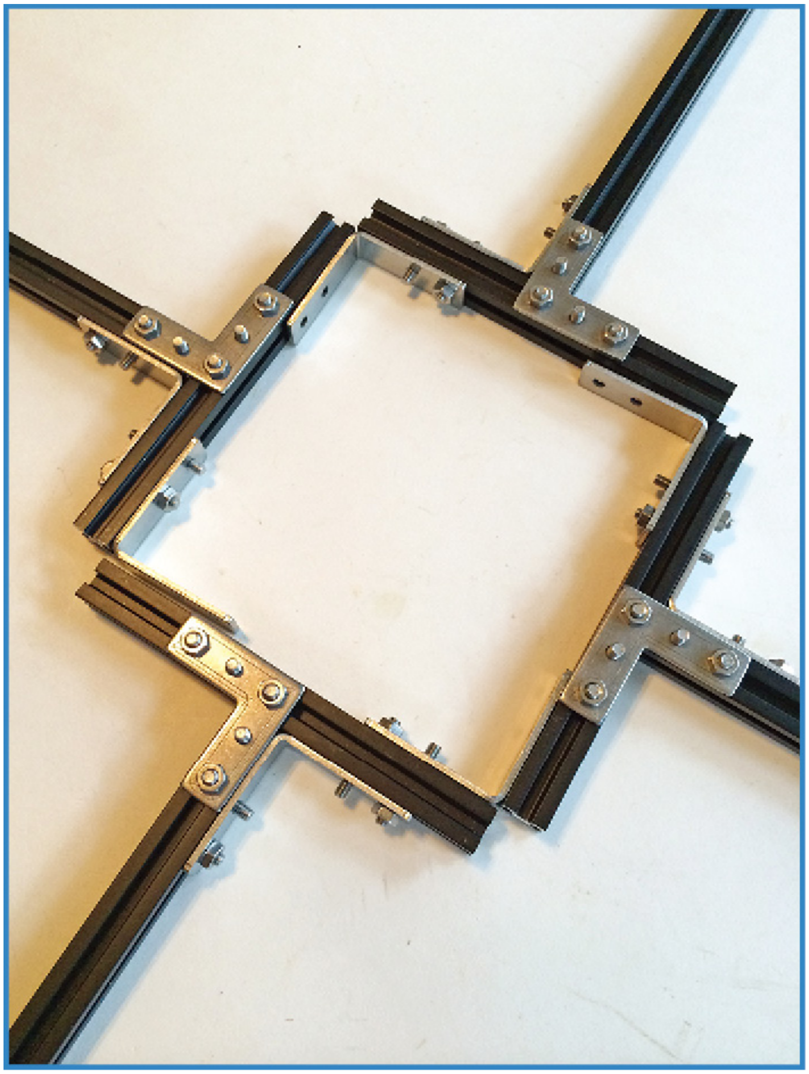
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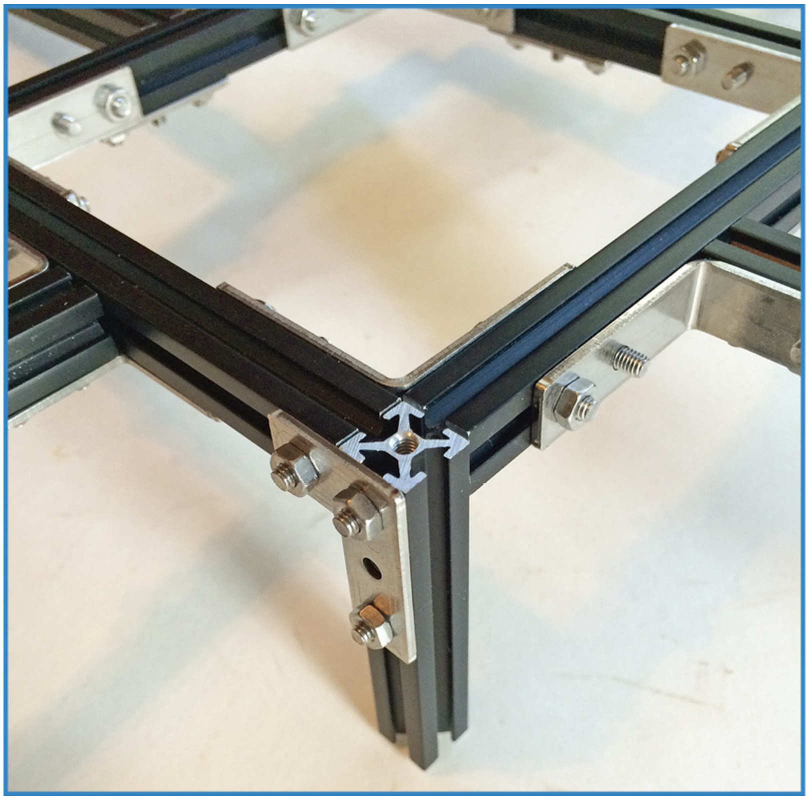
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2. [illegible]
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3. [illegible]L[illegible]4[illegible]60[illegible]L[illegible]9.14[illegible]



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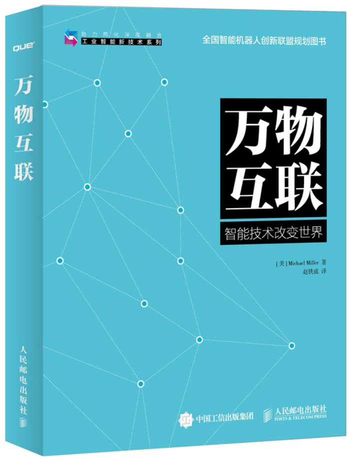
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9.3 □□

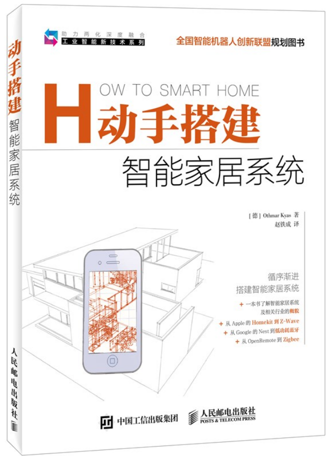
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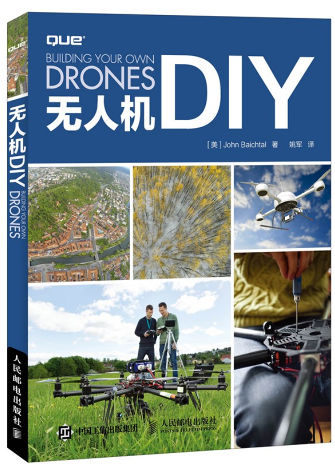
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- [illegible]2025[illegible]
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